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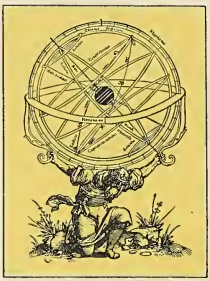

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The right Hon^ble Francis Lo: Veru-
lam, Viscount S^t Alban. Martius 9 Aprilis,
Anno Dñi. 1626. Annoq; Aetat 66.

SYLVA SYLVARVM
or
A NATVRALL HISTORY
In ten Centuries.

Written by the right Hon^ble Francis Lo: Verulam Viscount S^t Alban.

Publisht after y^e Author^s Death by W: RAWLEY D^r of Diuinity &c

Tho: Cecill sculp:

LONDON
Printed for W: Lee and are to be sould at the Great Turks head next to the Mytre Taurne in Fleetstreet

Anno 1627

SYLVA SYLVARVM:

OR

A Naturall Historie.

Geo Ray. 1823

IN TEN CENTURIES.

WRITTEN BY THE RIGHT
Honourable FRANCIS Lo. Verulam
Viscount St. *ALBAN.*

Published after the Authors death,
By WILLIAM RAWLEY *Doctor of Diuinity, his* Maiesties *Chaplaine.*

The third Edition.

LONDON,
Printed by *I. H.* for *William Lee* at the *Turkes Head* in *Fleet-street*, next to the *Miter*. 1631.

SYLVA
SYLVARVM:
OR
A Natural History.

TO THE MOST HIGH AND MIGHTY PRINCE CHARLES, BY THE GRACE OF GOD,

King of *Great Britaine*, *France*, and *Ireland*, Defender of the Faith, &c.

May it please your most Excellent Maiesty;

THe whole Body of the *Naturall Hystory*, either designed, or written, by the late *Lo. Viscount S. Alban*, was dedicated to your *Maiestie*, in his Booke *De Ventis*, about foure yeeres past, when your *Maiestie* was *Prince*: So as there needed no new Dedication of this *Worke*, but only, in all humblenesse, to let your *Maiestie* know, it is yours. It is true, if that *Lo.* had liued, your *Maiestie*, ere long, had beene inuoked, to the Protection of another *Historie*: VVhereof, not *Natures Kingdome*, as in this, but

but these of your *Maiesties*, (during the Time and *Reigne* of *King Henry* the *Eighth*) had beene the Subiect: Which since it died vnder the Designation meerely, there is nothing left, but your *Maiesties* Princely Goodnesse, graciously to accept of the Vndertakers Heart, and Intentions; who was willing to haue parted, for a while, with his Darling *Philosophie*, that he might haue attended your Royall Commandement, in that other *Worke*. Thus much I haue beene bold, in all lowlinesse, to represent vnto your *Maestie*, as one that was trusted with his *Lordships Writings*, euen to the last. And as this *Worke* affecteth the *Stampe* of your *Maiesties Royall Protection*, to make it more currant to the *World*; So vnder the *Protection* of this *Worke*, I presume in all humblenesse to approach your *Maiesties* presence; And to offer it vp into your *Sacred Hands*.

Your MAIESTIES most Loyall

and Deuoted Subiect,

W. RAWLEY.

To the Reader.

HAuing had the Honour to bee continually with my *Lord*, in compiling of this *Worke*; And to be employed therein; I haue thought it not amiſſe, (with his Lordſhips good leaue and liking,) for the better ſatisfaction of thoſe that ſhall reade it, to make knowne ſomewhat of his Lordſhips Intentions, touching the Ordering, and Publiſhing of the ſame. I haue heard his Lordſhip often ſay; that if hee ſhould haue ſerued the glory of his owne Name, hee had beene better not to haue publiſhed this *Naturall Hiſtory*: For it may ſeeme an Indigeſted Heape of Particulars; And cannot haue that Luſture, which Bookes caſt into Methods haue: But that he reſolued to preferre the good of Men, and that which might beſt ſecure it, before any thing that might haue Relation to Himſelfe. And he knew well, that

there was no other way open, to vnlooſe Mens mindes, being bound; and (as it were) Maleficiate, by the Charmes of deceiuing Notions, and Theories; and thereby made Impotent for Generation of Workes; but onely no where to depart from the Senſe, and cleare experience; But to keepe cloſe to it, eſpecially in the beginning: Beſides, this *Naturall Hiſtory* was a Debt of his, being Deſigned and ſet downe for a third part of the *Inſtauration*. I haue alſo heard his Lordſhip diſcourſe, that Men (no Doubt) will thinke many of the *Experiments* contained in this Collection, to bee Vulgar and Triuiall; Meane and Sordid; Curious and Fruitleſſe: And therefore hee wiſheth, that they would haue perpetually before their Eyes, what is now in doing; And the Difference betweene this *Naturall Hiſtory*, and others. For thoſe *Naturall Hiſtories*, which are Extant, being gathered for Delight and Vſe, are full of pleaſant Deſcriptions and Pictures; and affect and ſeek after Admiration, Rarities, and Secrets. But contrariwiſe, the Scope which his Lordſhip intendeth, is to write ſuch a *Naturall Hiſtory*, as may be Fundamentall to the Erecting and Building of a true *Philoſophy*: For the illumination of the *Vnderſtanding*; the Extracting of *Axiomes*; and the producing of many Noble *Workes*, and *Effects*. For hee hopeth, by this meanes, to acquit Himſelfe of that, for which hee taketh

Himſelfe

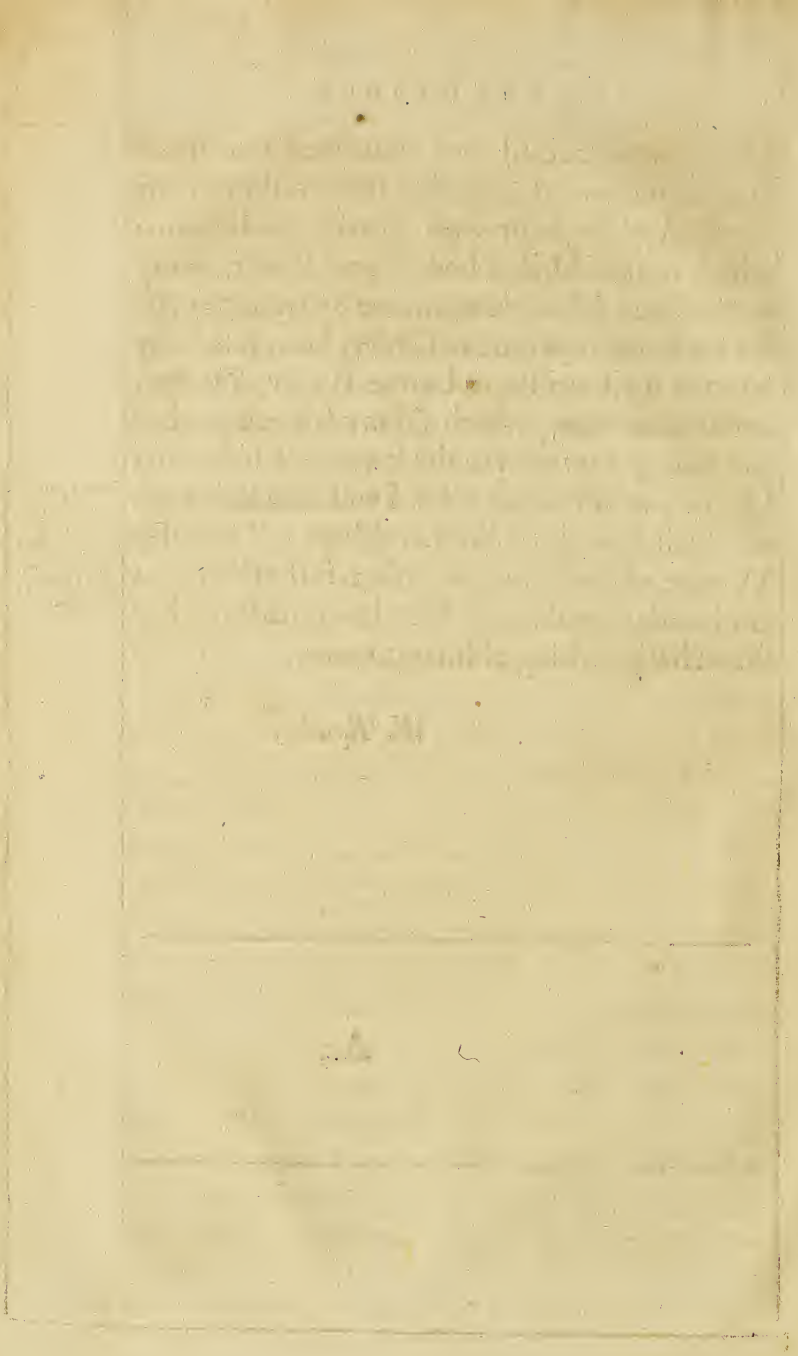
Himselfe in a sort bound; And that is, the Aduancement of all Learning & Sciences. For hauing in this present Worke Collected the Materials for the Building; And in his *Novum Organū* (of which his Lordship is yet to publish a second Part,) set downe the Instruments and Directions for the worke; Men shall now bee wanting to themselues, if they raise not Knowledge to that perfection, whereof the Nature of Mortall men is capable. And in this behalfe, I haue heard his Lordship speake complainingly; That his Lordship (who thinkth hee deserueth to bee an Architect in this building,) should bee forced to bee a Work man and a Labrourer; And to dig the Clay and burne the Brick; And more than that, (according to the hard Condition of the *Israelites* at the latter end) to gather the Straw and Stubble, ouer all the Fields, to burne the Bricks withall. For he knoweth, that except he doe it, nothing will bee done: Men are so set to despise the Meanes of their owne good And as for the *Basenesse* of many of the Experiments; As long as they be Gods Works, they are Honourable enough. And for the *Vulgarnesse* of them; true *Axiomes* must bee drawne from plaine Experience, and not from doubtfull; And his Lordships course is, to make Wonders Plaine, and not Plaine things Wonders; And that Experience likewise must bee broken and grinded, and not whole, or as it

groweth. And for *Vſe*; his Lordſhip hath often in his Mouth, the two kinds of *Experiments*; *Experimenta Fructifera*, and *Experimenta Lucifera*: *Experiments* of *Vſe*, and *Experiments* of *Light*; And hee reporteth himſelfe, whether hee were not a ſtrange Man, that ſhould thinke that Light hath no Vſe, becauſe it hath no Matter. Further, his Lordſhip thought good alſo, to adde vnto many of the *Experiments* themſelues, ſome *Gloſſe* of the *Cauſes*; that in the ſucceding worke of *Interpreting Nature*, and *Framing Axiomes*, all things may bee in more Readineſſe. And for the *Cauſes* herein by him aſſigned; his Lordſhip perſwadeth Himſelfe, they are farre more certaine, than thoſe that are rendred by Others; not for any Excellency of his owne VVit (as his Lordſhip is wont to ſay) but in reſpect of his continuall Conuerſation with *Nature* and *Experience*. Hee did conſider likewiſe, that by his Adition of *Cauſes*, Mens minds (which make ſo much haſte to find out the *Cauſes* of things;) would not thinke themſelues vtterly loſt, in a Vaſt VVood of *Experience*, but ſtay vpon theſe *Cauſes* (ſuch as they are) a litle, till true *Axiomes* may bee more fully diſcouered. I haue heard his Lordſhip ſay alſo, that one great Reaſon, why hee would not put theſe particulars into any exact *Method* (though hee that looketh attentiuely into them ſhall finde that they haue a ſecret

Order) was, becauſe hee conceiued that other men would now thinke, that they could doe the like; And ſo goe on with a further Collection; which if the *Method* had beene Exact, many would haue deſpaired to attaine by Imitation. As for his Lordſhips loue of Order, I can refer any Man to his Lordſhips Latine Booke, *De Augmentis Scientiarum*; which (if my Iudgement bee any thing) is written in the Exacteſt Order, that I know any Writing to be. I will conclude with an vſuall Speech of his Lordſhips; That this Worke of his *Naturall Hiſtory*. is the *World* as God made it, and not as Men haue made it; For that it hath nothing of Imagination.

W. Rawley.

This Epiſtle is the ſame, that ſhould haue beene prefixed to this Booke, if his Lordſhip, had liued.



NATVRALL HISTORIE.

I. Century.

1 Experiments in *Consort* touching the Straining and passing of Bodies, one thorow another; which they call *Percolation*.

DIgge a *Pit* vpon the *Sea-shore*, somewhat aboue the High-Water Marke, and sinke it as deepe as the Low-Water Marke; And as the *Tide* commeth in, it will fill with *water*, Fresh and Potable. This is commonly practised vpon the Coast of *Barbarie*, where other fresh *water* is wanting. And CAESAR knew this well, when hee was besieged in *Alexandria*: For by digging of *Pits* in the *Sea-shore*, hee did frustrate the Laborious Workes of the Enemies, which had turned the *Sea-water* upon the Wels of *Alexandria*; And so saued his Armie, being then in Desperation. But *Cæsar* mistooke the Cause; For he thought that all *Sea-Sands* had Naturall Springs of *Fresh water*. But it is plaine, that it is the *Sea-water*; because the Pit filleth according to the Measure of the *Tide*: And the *Sea-water* passing or Straining thorow the Sands, leaueth the Saltnesse.

2 I remember to haue read, that Triall hath beene made of *Salt water* passed thorow *Earth*; thorow Ten Vessels, one within another, and yet it hath not lost his Saltnesse, as to become potable: But the same Man saith, that (by the Relation of Another) *Salt water* drained thorow Twenty Vessels hath become Fresh. This *Experiment* seemeth to crosse that other of *Pits*, made by the *Sea-side*; And yet but in part, if it be true that twenty Repetitions doe the Effect. But it is worth the Note, how poore the Imitations of Nature are, in Common course of *Experiments*, except they bee led by great Iudgement, and some good Light of *Axiomes*. For first, there is no small difference betweene a Passage

Paſſage of *Water* thorow twenty ſmall Veſſels ; And thorow ſuch a diſtance, as betweene the Low water, and High water Marke. Secondly, there is a great difference betweene Earth and Sand. For all Earth hath in it a kinde of Nitrous Salt, from which Sand is more free : And beſides Earth doth not ſtraine the Water ſo finely, as Sand doth. But there is a Third Point, that I ſuſpect as much, or more, than the other Two : And that is, that in the *Experiment* of *Tranſmiſſion* of the *Sea-water* into the *Pits*, the *Water* riſeth ; But in the *Experiment* of Tranſmiſſion of the *Water* thorow the Veſſels, it falleth : Now certaine it is, that the Salter Part of *Water*, (once Salted thorow-out) goeth to the Bottome. And therefore no maruell, if the Draining of *Water* by deſcent, doth not make it freſh : Beſides, I doe ſomewhat doubt, that the very Daſhing of the *Water*, that commeth from the Sea, is more proper to ſtrike off the Salt Part, than where the *Water* ſlideth of her owne Motion.

3 It ſeemeth *Percolation* or *Tranſmiſſion*, (which is commonly called *Straining*,) is a good kinde of *Separation* ; Not onely of Thicke from Thin, and Groſſe from Fine ; But of more ſubtile Natures ; And varieth according to the Body thorow which the *Tranſmiſſion* is made. As if thorow a woolen Bagge, the Liquor leaueth the Fatneſſe ; If thorow Sand, the Saltneſſe ; &c. They ſpeake of Seuering Wine from Water, paſſing it thorow Iuy wood, or thorow other the like porous Body ; But *Non Conſtat*.

4 The *Gumme* of *Trees* (which wee ſee to bee commonly ſhining and cleare) is but a fine Paſſage or *Straining* of the Iuice of the Tree, thorow the Wood and Barke. And in like manner, *Cornish Diamonds*, and *Rocke Rubies*, (which are yet more reſplendent than *Gummes*) are the fine Exudations of *Stones*.

5 *Ariſtotle* giueth the Cauſe, vainely, why the *Feathers* of *Birds* are of more liuely Colours, than the *Haires* of *Beaſts* ; for no *Beaſt* hath any fine Azure, or Carnation, or Greene *Haire*. Hee ſaith, it is, becauſe *Birds* are more in the Beames of the Sunne, than *Beaſts* ; But that is manifeſtly vntrue; For *Cattle* are more in the Sun than *Birds*, that liue commonly in the Woods, or in ſome Couert. The true Cauſe is, that the Excrementious Moiſture of liuing Creatures, which maketh as well the *Feathers* in *Birds*, as the *Haire* in *Beaſts*, paſſeth in *Birds* thorow a finer and more delicate Strainer, than it doth in *Beaſts* : For *Feathers* paſſe thorow Quils ; And *Haire* thorow Skin.

6 The *Clarifying* of *Liquors* by Adheſion is an Inward *Percolation* ; And is effected, when ſome Cleauing Body is Mixed and Agitated with the *Liquors* ; whereby the groſſer Part of the *Liquor* ſtickes to that Cleauing Body ; And ſo the Finer Parts are freed from the Groſſer. So the *Apothecaries* clarifie their *Sirrups* by whites of Egges, beaten with the Iuices which they would clarifie ; which Whites of Egges, gather all the Dregges and groſſer Parts of the Iuice to them ; And after the *Sirrup* being ſet on the Fire, the Whites of Egges themſelues harden, and are

are taken forth. So *Ippocraſſe* is clarified by mixing with Milke; And ſtirring it about; And then paſſing it thorow a Woollen Bag, which they call *Hippocrates Sleeue:* And the Cleauing Nature of the Milke draweth the Powder of the Spices, and Groſſer Parts of the *Liquor* to it; And in the paſſage they ſticke vpon the Woolen Bag.

The *Clarifying* of *Water*, is an *Experiment* tending to Health; beſides the pleaſure of the Eye, when *Water* is Chryſtalline. It is effected by caſting in and placing Pebbles, at the Head of a Current; that the *Water* may ſtraine thorow them. 7

It may bee, *Percolation* doth not onely cauſe Cleareneſſe and Splendor, but Sweetneſſe of Sauour; For that alſo followeth, as well as Cleareneſſe, when the Finer Parts are ſeuered from the Groſſer. So it is found, that the Sweats of men that haue much Heat, and exerciſe much, and haue cleane Bodies, and fine Skins, doe ſmell ſweet; As was ſaid of *Alexander*; And wee ſee commonly, that *Gummes* haue ſweet Odours. 8

Experiments in Conſort touching *Motion* of *Bodies* vpon their *Preſſure.*

TAke a *Glaſſe*, and put *Water* into it, and wet your Finger, and draw it round about the Lip of the Glaſſe, preſſing it ſomewhat hard; And after you haue drawne it ſome few times about; it will make the Water friske and ſprinckle vp in a fine Dew. This *Inſtance* doth excellently Demonſtrate the Force of *Compreſſion* in a Sollid Body. For whenſoever a Sollid Body (as Wood, Stone, Mettall, &c.) is preſſed, there is an inward Tumult in the Parts thereof; ſeeking to deliuer themſelues from the Compreſſion: And this is the Cauſe of all *Violent Motion*. Wherein it is ſtrange in the higheſt Degree, that this *Motion* hath neuer beene obſerued, nor inquired: It being of all *Motions*, the moſt Common, and the Chiefe Root of all *Mechanicall Operations*. This *Motion* worketh in round at firſt, by way of Proofe, and Search, which way to deliuer it ſelfe; And then worketh in progreſſe, where it findeth the Deliuerance eaſieſt. In *Liquors* this *Motion* is viſible: For all Liquors ſtrucken make round Circles, and withall Daſh; but in *Solids*, (which breake not) it is ſo ſubtill, as it is inuiſible; But neuertheleſſe bewrayeth it ſelfe by many Effects; As in this *Inſtance* whereof wee ſpeake. For the *Preſſure* of the Finger furthered by the wetting (becauſe it ſticketh ſo much the better vnto the Lip of the *Glaſſe*) after ſome continuance, putteth all the ſmall Parts of the *Glaſſe* into worke; that they ſtrike the *Water* ſharply: from which *Percuſſion* that Sprinkling commeth. 9

If you ſtrike or pierce a *Solid Body*, that is brittle, as *Glaſſe*, or *Sugar*, it breaketh not onely, where the immediate force is; but breaketh all about into ſhiuers and fitters; The *Motion*, vpon the *Preſſure*, ſearching all wayes, and breaking where it findeth the *Body* weakeſt. 10

The *Powder* in *Shot*, being Dilated into ſuch a *Flame*, as endureth not *Compreſſion*; Moueth likewiſe in round (The *Flame* being in the Nature of a *Liquid Body*:) Sometimes recoiling; Sometimes breaking the *Piece*; 11

But

But generally discharging the *Bullet*, because there it findeth easiest Deliuerance.

12 This *Motion* vpon *Presſure*, and the Reciprocall thereof, which is *Motion* vpon *Tenſure*; wee vſe to call (by one common Name) *Motion of Liberty*; which is, when any *Body*, being forced to a *Preter-Naturall* Extent, or Demenſion, deliuereth and reſtoreth it ſelfe to the Naturall: As when a *Blowne Bladder* (Preſſed) riſeth againe; or when *Leather* or *Cloth* tentured ſpring backe. Theſe two *Motions* (of which there bee infinite inſtances) we ſhall handle in due place.

13 This *Motion* vpon *Preſſure* is excellently alſo demonſtrated in *Sounds*; As when one Chimeth vpon a *Bell*, it ſoundeth; but as ſoone as hee layeth his hand vpon it, the *Sound* ceaſeth: And ſo, the *Sound* of a *Virginall String*, as ſoone as the Quill of a Iacke falleth vpon it, ſtoppeth. For theſe *Sounds* are produced, by the ſubtill Percuſſion of the Minute parts, of the *Bell*, or *String*, vpon the Aire; All one, as the *Water* is cauſed to leape by the ſubtile Percuſſion of the Minute parts of the *Glaſſe*, vpon the Water, whereof wee ſpake a little before in the ninth *Experiment*. For you muſt not take it to bee, the locall *Shaking* of the *Bell*, or *String*, that doth it. As wee ſhall fully declare, when wee come hereafter to handle *Sounds*.

Experiments in *Conſort* touching *Separations* of *Bodies by weight*.

14 TAke a *Glaſſe* with a *Belly* and a long *Neb*; fill the *Belly* (in part) with *Water*: Take alſo another *Glaſſe*, whereinto put *Claret Wine* and *Water* mingled: Reuerſe the firſt *Glaſſe*, with the *Belly* vpwards, Stopping the *Neb* with your finger; Then dip the Mouth of it within the Second *Glaſſe*, and remoue your Finger; Continue it in that poſture for a time; And it will vnmingle the the *Wine* from *Water*: The *Wine* aſcending and ſetling in the top of the upper *Glaſſe*; And the *Water* deſcending and ſetling in the bottome of the lower *Glaſſe*. The paſſage is apparant to the Eye; For you ſhall ſee the *Wine*, as it were, in a ſmall veine, riſing thorow the *Water*. For handſomneſſe ſake (becauſe the Working requireth ſome ſmall time) it were good you hang the vpper *Glaſſe* vpon a Naile. But as ſoone as there is gathered ſo much pure and vnmixed *Water* in the bottome of the Lower *Glaſſe*, as that the Mouth of the vpper *Glaſſe* dippeth into it, the *Motion* ceaſeth.

15 Let the Vpper *Glaſſe* bee *Wine*, and the Lower *Water*; there followeth no *Motion* at all. Let the Vpper *Glaſſe* bee *Water* pure, the Lower *Water* coloured; or contrariwiſe; there followeth no *Motion* at all. But it hath beene tried, that though the Mixture of *Wine* and *Water*, in the Lower *Glaſſe*, bee three parts *Water*, and but one *Wine*; yet it doth not dead the *Motion*. This *Separation* of *Water* and *Wine* appeareth to bee made by *Weight*; for it muſt bee of *Bodies* of vnequall *Weight*, or elſe it worketh not; And the Heauier *Body* muſt euer bee in the vpper *Glaſſe*. But then note withall, that the *Water* being made penſile, and there being a great *Weight* of *Water* in the *Belly* of the *Glaſſe*, ſuſtained by

by a ſmall Pillar of *Water* in the Necke of the *Glaſſe*; It is that, which ſetteth the *Motion* on worke: For *Water* and *Wine* in one *Glaſſe*, with long ſtanding, will hardly ſeuer.

This *Experiment* woulde be Extended from Mixtures of ſeueral *Liquours* to *Simple Bodies*, which Conſiſt of ſeuerall Similare Parts: Try it therefore with *Brine* or *Salt Water*, and *Freſh Water*; Placing the *Salt Water* (which is the heauier) in the vpper *Glaſſe*. And ſee whether the *Freſh* will come aboue. Try it alſo with *Water thicke Sugred*, and *Pure Water*; and ſee whether the *Water* which commeth aboue, will loſe his ſweetneſſe: For which purpoſe it were good there were a little Cocke made in the Belly of the vpper *Glaſſe*. 16

IN *Bodies* containing Fine Spirits, which doe eaſily diſſipate, when you make *Infuſions*, the Rule is; A ſhort ſtay of the *Body* in the *Liquor* receiueth the Spirit; And a longer Stay confoundeth it; becauſe it draweth forth the Earthly Part withall; which embaſeth the finer. And therefore it is an Errour in *Phyſitians*, to reſt ſimply vpon the Length of ſtay, for increaſing the vertue. But if you will haue the *Infuſion* ſtrong, in thoſe kinde of *Bodies*, which haue fine Spirits, your way is, not to giue Longer time, but to repeat the *Infuſion* of the *Body* oftner. Take *Violets*, and infuſe a good Pugill of them in a Quart of Vineger; Let them ſtay three quarters of an houre, and take them forth; And refreſh the *Infuſion* with like quantity of new *Violets*, ſeuen times; And it will make a Vineger ſo freſh of the *Flower*, as if a Twelue-moneth after, it bee brought you in a Saucer, you ſhall ſmell it before it come at you. Note, that it ſmelleth more perfectly of the Flower, a good while after, than at firſt. Experiments in *Conſort* touching *Iudicious* and *Accurate Infuſions*, both in *Liquors*, and *Aire*. 17

This Rule, which wee haue giuen, is of ſingular vſe, for the Preparations of *Medicines*, and other *Infuſions*. As for Example; The Leafe of *Burrage* hath an excellent Spirit, to repreſſe the Fuliginous Vapour of Dusky Melancholy, and ſo to cure Madneſſe: But neuertheleſſe, if the Leafe be infuſed long, it yeeldeth forth but a raw ſubſtance, of no Vertue; Therefore I ſuppoſe, that if in the Muſt of Wine, or Wort of Beere, while it worketh, before it bee Tunned, the *Burrage* ſtay a ſmall time, and bee often changed with freſh; It will make a Soueraigne Drinke for Melancholy Paſſions. And the like I conceiue of *Orenge Flowers*. 18

Rubarb hath manifeſtly in it Parts of contrary Operations: Parts that purge; And parts that binde the Body: And the firſt lay looſer, and the latter lay deeper: So that if you infuſe *Rubarb* for an houre, and cruſh it well, it will purge better, and binde the Body leſſe after the purging, than if it ſtood twenty foure houres; This is tried: But I conceiue likewiſe, that by Repeating the *Infuſion* of *Rubarb*, ſeuerall times, (as was ſaid of Violets) letting each ſtay in but a ſmall time; you may make it as ſtrong a *Purging Medicine*, as *Scammony*. And it is not a ſmall thing wonne in *Phyſicke*, if you can make *Rubarb*, and other *Medi-* 19

cines

cines that are *Benedict*, as ſtrong Purgers, as thoſe that are not without ſome Malignity.

20 *Purging Medicines*; for the moſt part, haue their *Purgatiue* Vertue, in a fine Spirit; As appeareth by that they endure not boiling, without much loſſe of Vertue. And therefore it is of good vſe in *Phyſicke*, if you can retaine the *Purging* Vertue, and take away the Vnpleaſant taſte of the *Purger*; which it is like you may doe; by this courſe of *Infuſing* oft, with little ſtay. For it is probable, that the Horrible and Odious Taſte, is the Groſſer part.

21 Generally, the working by *Infuſions*, is groſſe and blinde, except you firſt try the Iſſuing of the ſeuerall Parts of the Body, which of them Iſſue more ſpeedily, and which more ſlowly; And ſo by apportioning the time, can take and leaue that Quality, which you deſire. This to know, there be two wayes; The one to try what long ſtay, and what ſhort ſtay worketh, as hath beene ſaid: The other to try in Order, the ſucceeding *Infuſions*, of one and the ſame Body, ſucceſſiuely, in ſeuerall *Liquours*. As for example; Take *Orenge-Pils*, or *Roſe-Mary*, or *Cinnamon*, or what you will; And let them *Infuſe* halfe an houre in *Water*: Then take them out, and *Infuſe* them againe in other *Water*; And ſo the third time: And then taſte and conſider the *Firſt Water*, the *Second*, and the *Third*: And you will finde them differing, not onely in Strength and Weakneſſe, but otherwiſe in Taſte, or Odour; For it may bee the *Firſt Water* will haue more of the Scent, as more Fragrant; And the *Second* more of the Taſte, as more Bitter or Biting, &c.

22 *Infuſions* in *Aire*, (for ſo we may well call *Odours*) haue the ſame diuerſities with *Infuſions* in *water*; In that the ſeuerall *Odours* (which are in one Flower, or other Body) iſſue at ſeuerall times; Some earlier, ſome later: So wee finde that *Violets*, *Woodbines*, *Strawberies*, yeeld a pleaſing Scent, that commeth forth firſt; But ſoone after an ill Scent, quite differing from the Former; Which is cauſed, not ſo much by Mellowing, as by the late iſſuing of the Groſſer Spirit.

23 As wee may deſire to extract the fineſt Spirits in ſome Caſes; So wee may deſire alſo to diſcharge them (as hurtfull) in ſome other. So *Wine burnt*, by reaſon of the Euaporating of the finer Spirit, enflameth leſſe, and is beſt in Agues: *Opium* leeſeth ſome of his poiſonous Quality, if it be vaporated out, mingled with *Spirit of Wine*, or the like: *Sean* leeſeth ſomewhat of his windineſſe by Decocting; And (generally) ſubtill or windy Spirits are taken off by incenſion, or Euaporation. And euen in *Infuſions* in things that are of too high a Spirit, you were better powre off the firſt *Infuſion*, after a ſmall time, and vſe the latter.

Experiment Solitary touching the *Appetite* of *Continuations in Liquids.*

24 *Bvbbles* are in the forme of an *Hemiſphere*; *Aire* within, and a little Skin of *water* without: And it ſeemeth ſomewhat ſtrange, that the *Aire* ſhould riſe ſo ſwiftly, while it is in the *water*; And when it commeth to the Top, ſhould bee ſtaid by ſo weake a Couer as that of the *Bubble* is. But as for the ſwift Aſſent of the *Aire*, while it is vnder

the

the *Water*, that is a *Motion* of *Percuſsion* from the *Water*; which it ſelfe deſcending, driueth vp the Aire; And no *Motion* of *Lenity* in the *Aire*. And this *Democritus* called *Motus Plagæ*. In this Common *Experiment*, the Cauſe of the Encloſure of the *Bubble* is, for that the Appetite to reſiſt Separation, or Diſcontinuance (which in ſollid *Bodies* is ſtrong) is alſo in *Liquours*, though fainter and weaker; As wee ſee in this of the *Bubble*: Wee ſee it alſo in little Glaſſes of Spittle that children make of Ruſhes; And in Caſtles of Bubbles, which they make by blowing into *Water*, hauing obtained a little Degree of Tenacity by Mixture of Soape: Wee ſee it alſo in the *Stillicides* of *Water*, which if there bee *Water* enough to follow, will Draw themſelues into a ſmall thred, becauſe they will not diſcontinue; But if there bee no Remedy, then they caſt themſelues into round Drops; Which is the Figure, that ſaueth the Body moſt from Diſcontinuance: The ſame Reaſon is of the Roundneſſe of the *Bubble*, as well for the Skin of *Water*, as for the *Aire* within: For the *Aire* likewiſe auoideth *Diſcontinuance*; And therefore caſteth it ſelfe into a Round Figure. And for the ſtop and Arreſt of the *Aire* a little while, it ſheweth that the *Aire* of it ſelfe hath little, or no Appetite, or Aſcending.

THE Reiection, which I continually uſe, of *Experiments*, (though it appeareth not) is infinite; But yet if an *Experiment* be probable in the Worke, and of great Vſe, I receiue it, but deliuer it as doubtfull. It was reported by a Sober Man, that an *Artificiall Spring* may bee made thus: Finde out a hanging Ground, where there is a good quicke Fall of Raine-water. Lay a Halfe-Trough of Stone, of a good length, three or foure foot deepe within the ſame Ground; with one end vpon the High Ground, the other vpon the Low. Couer the Trough with Brakes a good thickneſſe, and caſt Sand upon the Top of the Brakes: You ſhall ſee (ſaith hee) that after ſome ſhowers are paſt, the lower End of the Trough will run like a *Spring* of *water*: which is no maruell, if it hold, while the Raine-water laſteth; But hee ſaid it would continue long time after the Raine is paſt: As if the water did multiply it ſelfe vpon the Aire, by the helpe of the Coldneſſe and Condenſation of the Earth, and the Conſort of the firſt Water.

Experiment Solitary touching the Making of *Artificiall Springs*. 25

THE *French* (which put off the Name of the *French Diſeaſe*; vnto the Name of the *Diſeaſe* of *Naples*) doe report, that at the Siege of *Naples*, there were certaine wicked Merchants, that Barrelled vp *Mans fleſh* (of ſome that had beene, lately ſlaine in *Barbery*) and ſold it for *Tunny*; And that vpon that foule and high Nouriſhment, was the Originall of that *Diſeaſe*. Which may well bee; For that it is certaine, that the *Canibals* in the *Weſt Indies*, eat *Mans Fleſh*; And the *Weſt Indies* were full of the Pockes when they were firſt diſcouered: And at this day the *Mortalleſt Poiſons*, practiſed by the *Weſt-Indians*, haue ſome Mixture of the Bloud, or Fat, or Fleſh of *Man*: And diuers Witches, and

Experiment Solitary touching the *Venemous Quality* of *Mans fleſh*. 26

Sorceresses, as well amongst the *Heathen*, as amongst the *Christians*, haue fed vpon *Mans flesh*, to aid (as it seemeth) their Imagination, with High and foule Vapours.

Experiment Solitary touching the *Version* and *Transmutation* of *Aire* into *Water*. 27

IT seemeth that there bee these wayes (in likelihood) of *Version*, of *Vapours*. or *Aire*, into *Water* and *Moisture*. The first is *Cold*; which doth manifestly condense; As wee see in the *Contracting of the Aire* in the *Weather-Glasse*; Whereby it is a Degree nearer to *Water*. Wee see it also in the *Generation of Springs*, which the *Ancients* thought (very probably) to bee made by the *Version* of *Aire* into *Water*, holpen by the *Rest*, which the *Aire* hath in those Parts; Whereby it cannot dissipate. And by the *Coldnesse of Rockes*; For there *Springs* are chiefly generated. Wee see it also in the Effects of the *Cold* of the *Middle Region* (as they call it) of the *Aire*; Which produceth *Dewes*, and *Raines*. And the Experiment of turning *Water* into *Ice*, by Snow, Nitre, and Salt (whereof wee shall speake hereafter) would bee transferred to the Turning of *Aire* into *Water*. The Second way is by *Compression*; As in *Stillatories*, where the Vapour is turned backe, vpon it selfe, by the Encounter of the Sides of the *Stillatory*; And in the *Dew* vpon the Couers of *Boyling Pots*; And in the *Dew* towards *Raine*, vpon *Marble*, and *Wainscot*. But this is like to doe no great effect; Except it bee vpon Vapours, and grosse *Aire*, that are already very neere in Degree to Water. The Third is that, which may bee searched into, but doth not yet appeare; which is, by *Mingling* of *Moist Vapours* with *Aire*; And trying if they will not bring a Returne of more *Water*, than the *Water* was at first: For if so; That Increase is a *Version* of the *Aire*: Therefore put water into the Bottome of a *Stillatory*, with the Neb stopped; Weigh the *Water* first; Hang in the Middle of the *Stillatory* a large *Spunge*; And see what Quantity of *Water* you can crush out of it; And what it is more, or lesse, compared with the *Water* spent; For you must vnderstand, that if any *Version* can bee wrought, it will bee easiliest done in small Pores: And that is the Reason why wee prescribe a *Spunge*. The Fourth way it Probable also, though not Appearing; Which is, by *Receiuing the Aire* into the small *Pores of Bodies*; For (as hath beene said) euery thing in small Quantity is more easie for *version*; And Tangible Bodies haue no pleasure in the Consort of *Aire*, but endeuour to subact it into a more *Dense Body*: But in *Entire Bodies* it is checked; because if the *Aire* should Condense, there is nothing to succeed: Therefore it must be in *loose Bodies*, as *Sand* and *Powder*; which we see, if they lie close of themselues gather Moisture.

Experiment Solitary touching *Helpes* towards the *Beauty* and *good features* of *Persons*. 28

IT is reported by some of the *Ancients*; That *Whelps*, or other *Creatures*, if they bee put Young, into such a Cage, or Box, as they can not rise to their Stature, but may increase in Bredth, or Length; will grow accordingly, as they can get Roome: which if it bee true, and faisible, and that the young *Creature* so prest, and streightned,

tened, doth not thereupon dye; It is a Meanes to produce *Dwarfe Creatures*, and in a very Strange Figure. This is certaine, and noted long since; That the Presſure or Forming of Parts of Creatures, when they are very young, doth alter the Shape not a little; As the Stroaking of the Heads of Infants, betweene the Hands, was noted of Old, to make *Macrocephali*; which ſhape of the Head, at that time, was eſteemed. And the Raiſing gently of the Bridge of the Noſe, doth preuent the deformity of a Saddle-Noſe. Which obſeruation well weighed, may teach a Meanes, to make the Perſons of Men, and Women, in many kindes, more comely, and better featured, than otherwiſe they would bee; By the Forming and Shaping of them in their Infancy: As by Stroaking vp the Calues of the Legs, to keepe them from falling downe too low; And by Stroaking vp the Fore-head to keepe them from being low-foreheaded. And it is a common Practiſe to ſwathe Infants, that they may grow more ſtreight and better ſhaped: And we ſee Young Women, by wearing ſtreight Bodies, keepe themſelues from being Groſſe, and Corpulent.

Experiment Solitary touching the *Condenſing* of *Aire*, in ſuch ſort as it may put on *Weight*, and yeeld *Nouriſhment*. 29

ONions, as they hang, will many of them ſhoot forth; And ſo will *Penni roiall*; And ſo will an Herbe called *Orpin*; with which they vſe, in the Countrey, to trim their Houſes, binding it to a Lath, or Sticke, and ſetting it againſt a Wall. We ſee it likewiſe, more eſpecially, in the greater *Semper-viue*, which will put out Branches, two or three yeares: But it is true, that commonly they wrap the Root in a Cloth beſmeared with *Oile*, and renue it once in halfe a Yeare. The like is reported by ſome of the *Ancients*, of the *Stalkes of Lillies*. The Cauſe is; For that theſe *Plants* haue a Strong, Denſe, and Succulent Moiſture, which is not apt to exhale; And ſo is able, from the Old ſtore, without drawing helpe from the Earth, to ſuffice the ſprouting of the *Plant*: And this Sprouting is chiefly in the late Spring, or early Sommer; which are the times of putting forth. Wee ſee alſo, that *Stumps* of *Trees*, lying out of the ground, will put forth Sprouts for a Time. But it is a Noble Triall, and of very great Conſequence, to try whether theſe things, in the Sprouting, doe increaſe *Weight*; which muſt bee tried by weighing them before they bee hanged vp; And afterwards againe, when they are Sprouted. For if they increaſe not in *Weight*; Then it is no more but this; That what they ſend forth in the Sprout, they leeſe in ſome other Part: But if they gather *Weight*, then it is *Magnale Naturæ*; For it ſheweth that *Aire* may bee made ſo to bee Condenſed, as to be conuerted into a *Denſe Body*; whereas the Race and the Period of all things, here aboue the Earth, is to extenuate and turne things to be more *Pneumaticall*, and Rare, And not to bee Retrograde, from *Pneumaticall* to that which is *Denſe*. It ſheweth alſo, that *Aire* can *Nouriſh*; which is another great Matter of Conſequence. Note, that to try this, the *Experiment* of the *Semper-viue* muſt be made without Oiling the Cloth; For elſe it may be, the *Plant* receiueth Nouriſhment from the Oile.

Experiment Solitary touching the *Commixture* of *Flame* and *Aire*, And the *great force* thereof.

30

Flame and *Aire* doe not Mingle, except it bee in an *Instant*; Or in the *vitall spirits* of *Vegetables* and *Liuing Creatures*. In *Gunpowder*, the Force of it hath beene aſcribed, to Rarefaction of the Earthly Subſtance into *Flame*: And thus farre it is true: And then (forſooth) it is become another Element; the Forme whereof occupieth more place; And ſo, of Neceſſity, followeth a Dilatation: And therefore, leſt two Bodies ſhould bee in one place, there muſt needs alſo follow an Expulſion of the Pellet; Or Blowing vp of the Mine. But theſe are Crude and Ignorant Speculations. For *Flame*, if there were nothing elſe, except it were in very great quantity, will bee ſuffocate with any hard Body, ſuch as a Pellet is, or the Barrell of a Gunne; So as the *Flame* would not expell the hard Body; But the hard Body would kill the *Flame*, and not ſuffer it to kindle, or ſpread. But the cauſe of this ſo potent a Motion, is the *Nitre*, (which wee call otherwiſe *Salt-Petre*;) which hauing in it a notable Crude and windy *Spirit*, firſt, by the *Heat* of the *Fire* ſuddenly dilateth it ſelfe; (And wee know that ſimple *Aire*, being preternaturally attenuated by *Heat*, will make it ſelfe Roome, and breake and blow vp that which reſiſteth it;) And Secondly, when the *Nitre* hath dilated it ſelfe, it bloweth abroad the *Flame*, as an inward Bellowes. And therefore we ſee that *Brimſtone*, *Pitch*, *Camphire*, *Wilde-Fire*, and diuers other Inflamable Matters, though they burne cruelly, and are hard to quench; Yet they make no ſuch fiery winde, as *Gunpowder* doth: And on the other ſide, wee ſee that *Quick ſiluer*; (which is a moſt Crude and Watry *Body*) heated, and pent in, hath the like force with *Gun-powder*. As for *Liuing Creatures*, it is certaine, their *Vitall Spirits* are a Subſtance Compounded of an *Airy* and *Flamy* Matter; And though *Aire* and *Flame* being free, will not well mingle; yet bound in by a *Body* that hath ſome fixing, they will. For that you may beſt ſee in thoſe two Bodies (which are their *Aliments*,) *Water*, and *Oile*; For they likewiſe will not well mingle of themſelues, but in the Bodies of *Plants* and *Liuing Creatures*, they will. It is no maruell therefore, that a ſmall *Quantity* of *Spirits*, in the Cells of the Braine, and Canales of the Sinewes, are able to moue the whole Body, (which is of ſo great Maſſe) both with ſo great Force, as in Wreſtling, Leaping; And with ſo great Swiftneſſe, As in playing Diuiſion vpon the *Lute*. Such is the force of theſe two Natures, *Aire* and *Flame*, when they incorporate.

Experiment Solitary touching the *Secret Nature* of *Flame*.

31

TAke a ſmall *Wax-Candle*, and put it in a Socket; of Braſſe, or Iron; Then ſet it vpright in a Porringer full of *Spirit of Wine*, heated; Then ſet both the *Candle*, and *Spirit of Wine*, on fire, and you ſhall ſee the *Flame* of the *Candle*, open it ſelfe, and become foure or fiue times bigger than otherwiſe it would haue beene; and appeare in Figure *Globular*, and not in *Piramis*. You ſhall ſee alſo, that the Inward *Flame* of the *Candle* keepeth Colour, and doth not wax any whit blue towards the Colour of the Outward *Flame* of the *Spirit of Wine*. This is a Noble;

Inſtance

Instance; wherein two things are most remarkable; The one; that one *Flame* within another quencheth not, but is a fixed Body, and continueth as *Aire*, or *Water* doe. And therefore *Flame* would still ascend upwards in one greatnesse, if it were not quenched on the *Sides*: And the greater the *Flame* is at the Bottome, the higher is the Rise. The other, that *Flame* doth not mingle with *Flame*, as *Aire* doth with *Aire*, or *Water* with *Water*, but onely remaineth contiguous; As it commeth to passe betwixt Consisting Bodies. It appeareth also, that the forme of a Piramis in *Flame*, which we usually see, is meerely by Accident, and that the *Aire* about, by quenching the Sides of the *Flame*, crusheth it, and extenuateth it into that Forme; For of it selfe it would bee Round: And therefore *Smoake* is in the Figure of a Piramis Reuersed; For the *Aire* quencheth the *Flame*, and receiueth the *Smoake*. Note also, that the *Flame* of the *Candle*, within the *Flame* of the *Spirit of Wine*, is troubled; And doth not onely open and moue vpwards, but moueth wauing, and to and fro: As if *Flame* of his owne Nature (if it were not quenched) would rowle and turne, as well as move upwards. By all which it should seeme that the Cælestiall Bodies, (most of them) are true *Fires*, or *Flames*, as the *Stoicks* held; More fine (perhaps) and Rarified, than our *Flame* is. For they are all Globular, and determinate; They haue Rotation; And they haue the Colour and Splendour of *Flame*: So that *Flame* aboue is Durable, and Consistent, and in his Naturall place; But with vs, it is a Stranger, and Momentany, and Impure; Like *Vulcan* that halted with his Fall.

Experiment Solitary touching the *Different force* of *Flame* in the *Middest* and on the *Sides*.

32

TAke an *Arrow*, and hold it in *Flame*, for the space of ten pulses; And when it commeth forth, you shall finde those Parts of the *Arrow*, which were on the Outsides of the *Flame*, more burned, blacked, and turned almost into a Coale; whereas that in the Middest of the *Flame*, willbee, as if the Fire had scarce touched it. This is an *Instance* of great consequence for the discouery of the Nature of *Flame*; And sheweth manifestly, that *Flame* burneth more violently towards the Sides, than in the Middest: And, which is more, that *Heat* or *Fire* is not violent or furious, but where it is checked and pent. And therefore the *Peripatetickes* (howsoever their opinion of an *Element* of *Fire* aboue the *Aire* is iustly exploded;) in that Point they acquit themselves well: For being opposed, that if there were a *Spheare* of *Fire* that incompassed the Earth so neere hand, it were impossible but all things should be burnt up; They answer, that the pure *Elementall Fire*, in his owne place, and not irritate, is but of a Moderate *Heat*.

Experiment Solitary touching the *Decrease* of the *Naturall motion* of *Grauity* in *great distance from the Earth*, or *within some depth of the Earth*.

33

IT is affirmed constantly by many, as an usuall Experiment; That a *Lumpe* of *Vre* in the *Bottome* of a Mine, will be tumbled, and stirred, by two Mens strength; which if you bring it to the *Top* of the *Earth*, will aske Six Mens strength at the least to stirre it. It is a Noble *Instance*, and is fit to be tried to the full: For it is very probable, that the *Motion*

of Gravity worketh weakly, both farre from the Earth, and also within the Earth: The former, because the Apetite of Vnion of Dense Bodies with the Earth, in respect of the distance, is more dull; The latter, because the Body hath in part attained his Nature, when it is some Depth in the Earth. For as for the Morning to a *Point* or place (which was the Opinion of the *Ancients*) it is a meere Vanity.

Experiment Solitary touching the *Contraction* of *Bodies* in *Bulke*, by the *Mixture* of the more *Liquid Body* with the more *Solid*.

34

IT is strange, how the *Ancients* tooke vp *Experiments* vpon credit, and yet did build great Matters vpon them. The Observation of some of the best of them, delivered confidently is, That *Vessell* filled with *Ashes* will receive the like quantity of *Water*, that it would haue done, if it had beene empty. But this is vtterly vntrue; for the *Water* will not goe in by a Fifth part. And I suppose, that that Fifth part is the difference of the lying close, or open, of the *Ashes*; As wee see that *Ashes* alone, if they bee hard pressed, will lye in lesse roome: And so the *Ashes* with Aire betweene, lye looser; And with *Water*, closer. For I haue not yet found certainly, that the *Water*, it selfe, by mixture of *Ashes*, or *Dust*, will shrinke or draw into lesse Roome.

Experiment Solitary touching the *Making Vines* more *fruitfull*.

35

IT is reported of credit, that if you lay good store of *Kernels* of *Grapes*, about the *Root* of a *Vine*; it will make the *Vine* come earlier, and prosper better. It may bee tried with other *Kernels*, laid about the *Root* of a *Plant* of the same kinde; As *Figs*, *Kernels* of *Apples*, &c. The Cause may bee, for that the *Kernels* draw out of the Earth Iuice fit to nourish the *Tree*, as those that would bee *Trees* of themselues, though there were no *Root*; But the *Root* being of greater strength, robbeth and deuoureth the Nourishment, when they haue drawne it: As great *Fishes* deuoure little.

Experiments in Consort touching *Purging Medicines*.

36

THE *Operation* of *Purging Medicines*, and the *Causes* thereof, haue beene thought to be a great Secret; And so according to the slothfull manner of Men, it is referred to a *Hidden Propriety*, a *Specificall vertue*, and a *Fourth Quality*, And the like Shifts of Ignorance. The *Causes* of *Purging* are diuers; All plaine and perspicuous; And throughly maintained by Experience. The first is, That whatsoeuer cannot bee ouercome and digested by the *Stomacke*, is by the *Stomacke*, either put vp by *Vomit*, or put downe to the *Guts*; And by that *Motion* of *Expulsion* in the *Stomacke*, and *Guts*, other *Parts of the Body* (as the *Orifices* of the *Veines*, and the like) are moued to expell by *Consent*. For nothing is more frequent than *Motion of Consent* in the Body of Man. This Surcharge of the *Stomacke*, is caused either by the *Quality* of the *Medicine*, or by the *Quantity*. The *Qualities* are three: *Extreme Bitter*, as in *Aloes*, *Coloquintida*, &c. *Loathsome* and of horrible taste; As in *Agarick*, *Blacke Hellebore*, &c. And of *secret Malignity*, and disagreement towards *Mans Body*, many times not appearing much in the Taste; As in *Scammony*, *Mechoacham*, *Antimony*, &c. And note well, that if there be any *Medicine*, that

that *purgeth*, and hath neither of the first two *Manifest Qualities*; it is to bee held suspected, as a kinde of *Poison*; For that it worketh either by *Corrosion*; Or by a *Secret Malignity* and Enmity to *Nature*: And therefore such *Medicines* are warily to be prepared, and vsed. The *Quantity* of that which is taken, doth also cause *Purging*; as wee see in a great *Quantity* of *New Milke* from the Cow; yea, and a great *Quantity of Meat*; For *Surfets* many times turne to *Purges*, both vpwards, and downwards. Therefore we see generally, that the working of *Purging Medicines*, commeth two or three houres after the *Medicines* taken; For that the *Stomacke* first maketh a proofe, whether it can concoct them. And the like happeneth after *Surfets*; Or *Milke* in too great *Quantity*.

A second *Cause* is *Mordication* of the *Orifices* of the *Parts*; Especially of the *Mesentery Veines*; As it is seene, that *Salt*, or any such thing that is sharpe and biting, put into the Fundament, doth prouoke the Part to expell; And *Mustard* prouoketh Sneezing: And any sharpe Thing to the Eyes, prouoketh Teares. And therefore wee see that almost all *Purgers* haue a kinde of *Twitching* and *Vellication*, besides the *Griping* which commeth of winde. And if this *Mordication* bee in an ouer-high Degree, it is little better than the *Corrosion* of *Poison*; And it commeth to passe sometimes in *Antimony*; Especially if it be giuen, to Bodies not repleat with Humors; For where Humors abound, the Humors saue the Parts. 37

The third *Cause* is *Attraction*: For I doe not deny, but that *Purging Medicines* haue in them a direct Force of *Attraction*; As *Drawing Plasters* haue in *Surgery*: And wee see *Sage*, or *Betony bruised*, *Sneezing-powder*, and other *Powders* or *Liquors* (which the *Physitians* call *Errhines*,) put into the Nose, draw Flegme, and water from the Head; And so it is in *Apophlegmatismes*, and *Gargarismes*, that draw the Rheume downe by the Pallat. And by this Vertue, no doubt, some *Purgers* draw more one Humour, and some another, according to the Opinion receiued: As *Rubarb* draweth Choller, *Sean* Melancholy; *Agaricke* Flegme; &c. But yet, (more or lesse) they draw promiscuously. And note also, that besides Sympathy, betweene the *Purger* and the *Humour*, there is also another Cause, why some *Medicines* draw some Humour more than another. And it is, for that some *Medicines* worke quicker than others: And they that draw quicke, draw onely the Lighter, and more fluide Humours; they that draw slow, worke vpon the more Tough, and Viscous Humours. And therefore Men must beware, how they take *Rubarb*, and the like, alone, familiarly; For it taketh onely the Lightest part of the Humour away, and leaueth the Masse of Humours more obstinate. And the like may bee said of *Worme-wood*, which is so much magnified. 38

The fourth *Cause* is *Flatuosity*: For *Wind* stirred moueth to expell: And wee finde that (in effect) all *Purgers* haue in them a raw *Spirit*, or *Winde* which is the Principall *Cause* of *Tortion* in the *Stomacke*, and *Belly*. And therefore *Purgers* leese (most of them) the Vertue, by Decoction vpon the Fire; And for that Cause are giuen chiefly in Infusion, Iuyce, or Powder. 39

The

40 The fifth *Cauſe* is *Compreſſion*, or *Cruſhing:* As when *Water* is Cruſhed out of a *Spunge:* So wee ſee that *Taking Cold* moueth Looſeneſſe by Contraction of the Skinne, and outward Parts; And ſo doth *Gold* likewiſe cauſe Rheumes, and Defluxions from the Head; And ſome *Aſtringent Plaſters* cruſh out purulent Matter. This kinde of Operation is not found in many *Medicines: Mirabolanes* haue it; And it may bee the *Barkes of Peaches*; For this Vertue requireth an *Aſtriction*; but ſuch an *Aſtriction* as is not gratefull to the Body: (For a pleaſing *Aſtriction* doth rather Binde in the Humours, than Expell them:) And therefore ſuch *Aſtriction* is found in Things of an Harriſh Taſte.

41 The Sixth *Cauſe* is *Lubrefaction*, and *Relaxation*. As wee ſee in *Medicines Emollient*; Such as are *Milke*, *Honey*, *Mallowes*, *Lettuce*, *Mercuriall*, *Pelletory of the Wall*, and others. There is alſo a ſecret Vertue of *Relaxation* in *Cold:* For the *Heat* of the Body bindeth the Parts and Humours together, which *Cold* relaxeth: As it is ſeene in *Vrine*, *Bloud*, *Pottage*, or the like; which, if they bee *Cold*, breake and diſſolue. And by this kinde of *Relaxation*, *Feare* looſeneth the Belly; becauſe the Heat retiring inwards towards the Heart, the Guts and other Parts are relaxed; In the ſame manner, as *Feare* alſo cauſeth Trembling in the Sinewes. And of this Kinde of *Purgers*, are ſome *Medicines* made of *Mercury*.

42 The Seuenth *Cauſe* is *Abſtertion*; which is plainely a *Scouring off*, or *Inciſion* of the *more viſcous Humours*, and making the *Humors* more fluide; And Cutting betweene them, and the Part. As is found in *Nitrous Water*, which ſcoureth Linnen Cloth (ſpeedily) from the Foulneſſe. But this *Inciſion* muſt bee by a *Sharpneſſe*, without *Aſtriction*; Which wee finde in *Salt*, *Worme-wood*, *Oxymel*, and the like.

43 There bee *Medicines*, that moue *Stooles*, and not *Vrine*; Some other, *Vrine*, and not *Stooles*. Thoſe that *Purge by Stoole* are ſuch as enter not at all, or little into the *Meſentery Veines*; But either at the firſt are not digeſtible by the *Stomacke*, and therefore moue immediately downwards to the *Guts*; Or elſe are afterwards reiected by the *Meſentery Veines*, and ſo turne likewiſe downwards to the *Guts*; and of theſe two kindes are moſt *Purgers*. But thoſe that moue *Vrine*, are ſuch, as are well digeſted of the *Stomacke*, and well receiued alſo of the *Meſentery Veines*; So they come as farre as the *Liuer*, which ſendeth *Vrine* to the *Bladder*, as the *Whey* of *Blood:* And thoſe *Medicines* being Opening and Piercing, doe fortifie the Operation of the *Liuer*, in ſending downe the wheyey Part of the Blood to the *Reines*. For *Medicines Vrinatiue* doe not worke by Reiection, and Indigeſtion, as *Solutiue* doe.

44 There bee diuers *Medicines*, which in greater *Quantity*, moue *Stoole*, and in ſmaller, *Vrine:* And ſo contrariwiſe, ſome that in greater *Quantity*, moue *Vrine*, and in Smaller, *Stoole*. Of the former ſort is *Rubarb*, and ſome others. The *Cauſe* is, for that *Rubarb* is a *Medicine*, which the Stomacke in a ſmall Quantity doth digeſt, and ouercome, being not Flatuous, nor Loathſome;) and ſo ſendeth it to the *Meſentery Veines*; And ſo being opening, it helpeth downe *Vrine:* But in a greater Quantity, the

the *Stomacke* cannot ouercome it, and ſo it goeth to the *Guts*. *Pepper* by ſome of the *Ancients* is noted to bee of the ſecond ſort; which being in ſmall *Quantity*. moueth winde in the Stomacke and Guts, and ſo expelleth by *Stoole*; But being in greater *Quantity*, diſſipateth the *Winde*; And it ſelfe getteth to the *Meſentery Veines*; And ſo to the *Liuer*, and *Reines*; where, by Heating and Opening, it ſendeth downe *Vrine* more plentifully.

WEE haue ſpoken of *Euacuating* of the *Body*; we will now ſpeake ſomething of the *Filling* of it by *Reſtoratiues* in *Conſumptions*, and *Emaciating diſeaſes*. In *Vegetables*, there is one part that is more Nouriſhing than another; As *Graines*, and *Roots* nouriſh more, than the *Leaues*; In ſo much as the *Order* of the *Foliatanes* was put downe by the *Pope*, as finding Leaues vnable to nouriſh mans Body. Whether there bee that difference in the Fleſh of *Liuing Creatures*, is not well inquired: As whether *Liuers*, and other *Entrailes*, bee not more Nouriſhing, than the *Outward Fleſh*. Wee finde that amongſt the *Romans*, a *Gooſes Liuer* was a great Delicacy; In ſo much as they had Artificiall Meanes to make it faire, and great; But whether it were more Nouriſhing, appeareth not. It is certaine, that *Marrow* is more Nouriſhing than *Fat*. And I conceiue that ſome Decoction of *Bones*, and *Sinewes*, ſtamped, and well ſtrained, would bee a very *Nouriſhing Broth*: We finde alſo that *Scotch Schincke*, (which is a Pottage of ſtrong Nouriſhment) is made with the *Knees*, and *Sinewes* of *Beefe*: but long boiled: *Ielly* alſo, which they vſe for a Reſtoratiue, is chiefly made of *Knuckles* of *Veale*. The *Pulpe* that is within the *Craſiſh* or *Crabb*, which they ſpice and butter, is more Nouriſhing than the *Fleſh* of the *Crabb* or *Craſiſh*. The *Tolkes* of *Egges* are clearely more Nouriſhing than the *Whites*. So that it ſhould ſeeme, that the Parts of *Liuing Creatures*, that lye more Inwards, nouriſh more than the Outward Fleſh: Except it be the *Braine*; which the Spirit prey too much vpon, to leaue it any great Vertue of Nouriſhing. It ſeemeth for the Nouriſhing of Aged Men, or Men in Conſumptions, ſome ſuch thing ſhould bee Deuiſed, as ſhould bee halfe *Chylus*, before it be put into the Stomacke.

Experiments in *Conſort* touching *Meats* and *Drinks* that are moſt Nouriſhing. 45

Take two large *Capons*; perboile them vpon a ſoft fire, by the ſpace of an houre, or more, till in effect all the Bloud bee gone. Adde in the Decoction the *Pill* of a *Sweet Limon*, or a good part of the *Pill* of a *Citron*, and a little *Mace*. Cut off the *Shankes*, and throw them away. Then with a good ſtrong Chopping-knife, Mince the two *Capons*, Bones and all, as ſmall as ordinary Minced Meat; Put them into a large neat Boulter; Then take a Kilderkin, ſweet, and well ſeaſoned, of foure Gallons of Beere, of 8. s. ſtrength, Now as it commeth from the Tunning; Make in the Kilderkin a great Bung-hole of purpoſe: Then thruſt into it, the Boulter (in which the *Capons* are) drawne out in length; Let it ſteepe in it three Dayes, and three Nights, the Bung-hole open, to worke; Then cloſe the Bung-hole, and ſo let it continue, a Day and a halfe; Then 46

draw

d raw it into Bottles, and you may drinke it well after three dayes Bottelling; And it will laſt ſix weekes (approued.) It drinketh freſh, flowreth and mantleth exceedingly; It drinketh not newiſh at all; It is an excellent Drinke for a Conſumption, to bee drunke either alone, or Carded with ſome other Beere. It quencheth Thirſt, and hath no whit of windineſſe. Note, that it is not poſſible, that Meat and Bread, either in Broths, or taken with Drinke, as is vſed, ſhould get forth into the Veines, and outward Parts, ſo finely, and eaſily, as when it is thus incorporate, and made almoſt a *Chilus* aforehand.

47 Triall would be made of the like Brew with *Potado Roots*, or *Burre Roots* or the *Pith* of *Artichoakes*, which are nouriſhing Meats: It may bee tried alſo, with other fleſh; As *Pheſant*, *Partridge*, *Young Porke*, *Pig*, *Veniſon*, eſpecially of *Young Deere*, &c.

48 A *Mortreſſe* made with the *Brawne* of *Capons*, ſtamped, and ſtrained, and mingled (after it is made) with like quantity, (at the leaſt,) of *Almond Butter*; is an excellent Meat to Nouriſh thoſe that are weake; Better than *Blanck-manjar*, or *Ielly*: And ſo is the *Cullice* of *Cockes*, Boiled thicke with the like mixture of *Almond Butter*: For the *Mortreſſe*, or *Cullice*, of it ſelfe, is more Sauoury and ſtrong; and not ſo fit for Nouriſhing of weake Bodies; But the *Almonds* that are not of ſo high a taſte as *Fleſh*, doe excellently qualifie it.

49 *Indian Maiz* hath (of certaine) an excellent Spirit of Nouriſhment: But it muſt bee thorowly boyled, and made into a *Maiz-Creame* like a *Barley Creame*. I iudge the ſame of *Rize*, made into a Creame; For *Rize* is in *Turkey*, and other Countreys of the Eaſt, moſt fed vpon; But it muſt bee thorowly boyled in reſpect of the hardneſſe of it: And alſo becauſe otherwiſe it bindeth the Body too much.

50 *Piſtachoes*, ſo they bee good, and not Muſty, ioyned with *Almonds* in *Almond Milke*; Or made into a *Milke* of themſelues, like vnto *Almond Milke*, but more greene, are an excellent Nouriſher. But you ſhall doe well, to adde a little *Ginger*, ſcraped, becauſe they are not without ſome ſubtill windineſſe.

51 *Milke* warme from the Cow, is found to bee a great Nouriſher, and a good Remedy in *Conſumptions*: But then you muſt put into it, when you milke the Cow, two little bagges; the one of *Powder of Mint*, the other of *Powder of Red Roſes*; For they keepe the *Milke* ſomewhat from Turning, or Crudling in the ſtomacke; And put in Sugar alſo for the ſame cauſe, and partly for the Taſtes ſake; But you muſt drinke a good draught that it may ſtay leſſe time in the Stomacke, leſt it Crudle: And let the Cup into which you milke the Cow, be ſet in a greater Cup of hot Water, that you may take it warme. And *Cow-milke*, thus prepared, I iudge to be better for a *Conſumption*, than *Aſſe-milke*, which (it is true) turneth not ſo eaſily, but it is a little harriſh; Marry it is more proper for Sharpneſſe of Vrine, and Exulceration of the Bladder, and all manner of Lenifyings. *Womans Milke* likewiſe is preſcribed, when all faile; but I commend it not; as being a little too neere the Iuyce of

Mans

Mans Body, to be a good Nouriſher; Except it be in *Infants*, to whom it is Naturall.

Oyle of *Sweet Almonds*, newly drawne, with *Sugar*, and a little *Spice*, 52
ſpread vpon Bread toſted, is an Excellent Nouriſher; But then to keepe the *Oyle* from frying in the Stomacke, you muſt drinke a good draught of Milde Beere after it; And to keepe it from relaxing the Stomacke too much, you muſt put in a little Powder of Cinnamon.

The *Yolkes* of *Egges* are of themſelues ſo well prepared by Nature for 53
Nouriſhment; As (ſo they bee Potched, or Reare boiled) they need no other Preparation, or Mixture: yet they may bee taken alſo raw, when they are new laid, with *Malmeſey*, or *Sweet Wine*; You ſhall doe well to put in ſome few Slices of *Eryngium Roots*, and a little *Amber-grice*; For by this meanes, beſides the immediat Faculty of Nouriſhment, ſuch Drinke will ſtrengthen the Backe; So that it will not draw downe the *Vrine* too faſt; For too much *Vrine* doth alwayes hinder Nouriſhment.

Mincing of meat, as in *Pies*, and *Buttered Minced Meat*, ſaueth the Grin- 54
ding of the Teeth; And therefore, (no doubt) it is more Nouriſhing; Eſpecially in Age; Or to them that haue weake Teeth; But the Butter is not ſo proper for weake Bodies; And therefore it were good to moiſten it with a little *Claret Wine*, Pill of *Limon*, or *Orenge*, cut ſmall, *Sugar*, and a very little *Cinnamon*, or *Nutmegg*. As for *Chuets*, which are likewiſe minced Meat, in ſtead of Butter, and Fat, it were good to moiſten them, partly with *Creame*, or *Almonds* or *Piſtacho Milke*, or *Barley*, or *Maiz Creame*; Adding a little *Coriander Seed*, and *Carraway Seed*, and a very little *Saffron*. The more full Handling of *Alimentation* wee reſerue to the due place.

Wee haue hitherto handled the Particulars *which yeeld beſt, and eaſieſt, and plentifulleſt Nouriſhment; And now we will ſpeake of the beſt* Meanes *of Conueying, and Conuerting the Nouriſhment.*

The Firſt *Meanes* is, to procure that the *Nouriſhment* may not bee rob- 55
bed, and drawne away; wherein that, which wee haue already ſaid, is very Materiall; To prouide, that the *Reines* draw not too ſtrongly an ouer-great Part of the *Blood* into *Vrine*. To this adde that Precept of *Ariſtotle*, that *Wine* be forborne in all *Conſumptions*; For that the *Spirits* of the *Wine*, doe prey vpon the Roſcide Iuyce of the Body, and inter-common with the Spirits of the Body, and ſo deceiue and rob them of their Nouriſhment. And therefore if the *Conſumption* growing from the weakneſſe of the Stomacke, doe force you to vſe *Wine*; let it alwayes be burnt, that the Quicker Spirits may euaporate; or at the leaſt quenched with two little wedges of Gold, ſix or ſeuen times repeated. Adde alſo this Prouiſion; That there bee not too much *Expence* of the *Nouriſhment*, by *Exhaling* and *Sweating*: And therefore if the Patient be apt to ſweat, it muſt bee gently reſtrained. But chiefly *Hyppocrates* Rule is to bee followed; who aduiſeth quite contrary to that which is in vſe: Namely, that the *Linnen*, or *Garment* next the Fleſh, bee in Winter drie, and oft changed;

changed; And in Sommer ſeldome changed, and ſmeared ouer with Oyle; For certaine it is, that any Subſtance that is Fat, doth a little fill the Proes of the Body, and ſtay Sweat, in ſome Degree. But the more cleanly way is to haue the *Linnen* ſmeared lightly ouer, with *Oyle* of *Sweet Almonds*; And not to forbeare ſhifting as oft as is fit.

56 The ſecond *Meanes* is, to ſend forth the *Nouriſhment* into the *Parts*, more ſtrongly; For which, the working muſt bee by *Strengthening* of the *Stomack*; And in this, becauſe the *Stomacke* is chiefly comforted by *Wine*, and *Hot things*, which otherwiſe hurt; it is good to reſort to *Outward Applications* to the *Stomacke*: Wherein it hath beene tried, that the *Quilts* of *Roſes*, *Spices*, *Maſticke*, *Worme-wood*, *Mint*, &c. are nothing ſo helpfull, as to take a *Cake* of *New bread*, and to bedew it with a little *Sacke*, or *Alegant*; And to dry it; And after it bee dried a little before the Fire, to put it within a cleane Napkin, and to lay it to the Stomacke: For it is certaine that all Flower hath a potent Vertue of *Aſtriction*; In ſo much as it hardneth a peece of fleſh, or a Flower, that is laid in it: And therefore a *Bagge* quilted with *Bran*, is likewiſe very good; but it drieth ſomewhat too much; And therefore it muſt not lye long.

57 The third *Meanes*, (which may bee a Branch of the former) is to ſend forth the *Nouriſhment* the better by *Sleepe*. For wee ſee, that Beares, and other *Creatures* that *Sleepe* in the Winter wax exceeding Fat: And certaine it is, (as it is commonly beleeued) that *Sleepe* doth Nouriſh much; Both for that the Spirits doe leſſe ſpend the Nouriſhment in *Sleepe*, than when liuing *Creatures* are awake: And becauſe (that which is to the preſent purpoſe) it helpeth to thruſt out the Nouriſhment into the Parts. Therefore in Aged men, and weake Bodies, and ſuch as abound not with Choller, a ſhort *Sleepe* after dinner doth helpe to Nouriſh; For in ſuch Bodies there is no feare of an ouer-haſty Diſgeſtion, which is the Inconuenience of Poſtmeridian *Sleepes*. *Sleepe* alſo in the Morning, after the taking of ſomewhat of eaſie Digeſtion; As *Milke* from the Cow, *Nouriſhing Broth*, or the like; doth further Nouriſhment: But this would be done, ſitting vpright, that the *Milke* or *Broth* may paſſe the more ſpeedily to the Bottome of the Stomacke.

58 The Fourth *Meanes* is to prouide that the Parts themſelues may draw to them the Nouriſhment ſtrongly. There is an Excellent Obſeruation of *Ariſtotle*; That a great Reaſon, why Plants (ſome of them) are of greater Age, than *Liuing Creatures*, is, for that they yearely put forth new Leaues and Boughes; Whereas *Liuing Creatures* put forth (after their Period of Growth,) nothing that is young, but Haire and Nailes which are Excrements, and no Parts. And it is moſt certaine, that whatſoeuer is Young, doth draw Nouriſhment better, than that which is Old; And then (that which is the Myſtery of that Obſeruation) Young *Boughes*, and *Leaues*; calling the Sap vp to them; the ſame Nouriſheth the *Body*, in the Paſſage. And this wee ſee notably proued alſo, in that the oft Cutting, or Polling of *Hedges*, *Trees*, and *Herbs*, doth conduce much to their Laſting. Transferre therefore this Obſeruation to the

Helping

Helping of Nourishment in *Living Creatures*: The Noblest and Principall Vse whereof is, for the *Prolongation* of *Life*; *Restauration* of some Degree of *Youth*; and *Inteneration* of the *Parts*: For certaine it is, that there are in *Living Creatures* Parts that Nourish, and repaire Easily; And Parts that Nourish and repaire hardly, And you must refresh, and renew those that are easie to Nourish, that the other may bee refreshed, and (as it were) Drinke in Nourishment in the Passage. Now we see that *Draught Oxen*, put into good Pasture, recouer the Flesh of young Beefe; And Men after long Emaciating Diets, wax plumpe, and fat, and almost New: So that you may surely conclude, that the frequent and wise Vse of those *Emaciating Diets*, and of *Purgings*: And perhaps of some kinde of *Bleeding*; is a principall Meanes of *Prolongation* of *Life*; And *Restoring* some Degree of *Youth*: For as we haue often said, *Death* commeth vpon *Liuing Creatures* like the Torment of *Mezentius*.

Mortua quinetiam iungebat Corpora viuis.
Componens Manibus & Manus, at & Oribus Ora.

For the Parts in Mans Body easily reparable (as *Spirits*, *Bloud*, and *Flesh*) die in the Embracement of the Parts hardly reparable (as *Bones*, *Nerues*, and *Membranes*;) and likewise some *Entrailes* (which they reckon amongst the *Spermaticall Parts*) are hard to repaire: though that Diuision of *Spermatecall*, and *Menstruall Parts*, be but a Conceit. And this same *Obseruation* also may be drawne to the present purpose of Nourishing Emaciated Bodies: And therefore *Gentle Frication* draweth forth the Nourishment, by making the Parts a little hungry, and heating them; whereby they call forth Nourishment the better. This *Frication* I wish to bee done in the Morning. It is also best done by the *Hand*, or a peece of *Scarlet Wooll*, wet a little with *Oyle* of *Almonds*, mingled with a small Quantity of *Bay-salt*, or *Saffron*. We see that the very Currying of Horses doth make them fat, and in good liking.

The Fifth *Meanes* is, to further the very *Act* of *Assimilation* of *Nourishment*; which is done by some outward *Emollients*, that make the Parts more apt to *Assimilate*. For which I haue compounded an *Ointment* of Excellent Odour, which I call *Roman Ointment*, *vide* the *Receit*. The vse of it would bee betweene Sleepes; For in the latter Sleepe the Parts assimilate chiefly. 59

THere bee many *Medicines*, which by themselues would doe no Cure, but perhaps Hurt, But being applied in a certaine Order, one after another, doe great Cures. I haue tried (my selfe) a *Remedy* for the *Gout*, which hath seldome failed, but driuen it away in 24. Houres space: It is first to apply a *Pultasse*; of which *vide* the *Receit*; And then a *Bath* or *Fomentation*, of which *vide* the *Receit*; And then a *Plaister*, *vide* the *Receit*. The *Pultasse* relaxeth the Pores, and maketh the Humour apt to Exhale The *Fomentation* calleth forth the Humour by Vapours; But yet in regard of the way made by the *Pultasse*, draweth gently; And therefore draweth the Humour out; and doth not draw more to it; For it

Experiment Solitary touching *Filum Medicinale*. 60

is a *Gentle Fomentation*, and hath withall a Mixture (though very little) of some *Stupefactiue*. The *Plaister* is a Moderate *Astrigent Plaister*, which repelleth New Humour from falling. The *Pultasse* alone would make the Part more soft, and weake; And apter to take the Defluxion and Impression of the Humour. The *Fomentation* alone, if it were too weake, without way made by the *Pultasse*, would draw forth little; if too strong, it would draw to the Part, as well as draw from it. The *Plaister* alone, would pen the Humour already contained in the Part, and so exasperate it, as well as forbid new Humour. Therefore they must be all taken in Order, as is said. The *Pultasse* is to be laid to for two or three Houres: The *Fomentation* for a Quarter of an Houre, or somewhat better, being vsed hot, and seuen or eight times repeated: The *Plaister* to continue on still, till the Part be well confirmed.

Experiment Solitary touching *Cure by Custome*. 61

THere is a secret Way of *Cure* (vnpractised;) By *Assuetude* of that which in it selfe hurteth. *Poisons* haue been made, by some, Familiar, as hath beene said; *Ordinary keepers* of the *Sicke* of the *Plague*, are seldome infected. *Enduring* of *Torture*, by *Custome*, hath beene made more easie: The *Brooking* of Enormous *Quantity* of *Meats*, and so of *Wine* or *Strong Drinke*, hath beene, by *Custome*, made to bee without *Surfet*, or *Drunkennesse*. And generally *Diseases* that are *Chronicall*, as *Coughes*, *Phthisickes*, some kindes of *Palseyes*, *Lunacies*, &c. are most dangerous at the first: Therefore a wise *Physitian* will consider whether a *Disease* be Incurable; Or whether the Iust Cure of it bee not full of perill; And if hee finde it to be such, let him resort to *Palliation*; And alleuiate the *Symptome*, without busying himselfe too much with the perfect *Cure*: And many times, (if the *Patient* bee indeed patient) that Course will exceed all Expectation. Likewise the *Patient* himselfe may striue, by little and little to Ouercome the *Symptome*, in the Exacerbation, and so, by time, turne Suffering into Nature.

Experiment Solitary touching *Cure by Excesse*. 62

DIuers *Diseases*, especially *Chronicall* (such as *Quartan Agues*;) are sometimes cured by *Surfet*, and *Excesses*; As *Excesse of Meat*, *Excesse of Drinke*, *Extraordinary Fasting*, *Extraordinary Stirring*, or *Lassitude*, and the like. The Cause is, for that *Diseases* of *Continuance* get an Aduentitious Strength from Custome, besides their *Materiall Cause* from the *Humours*: So that the *Breaking* of the *Custome* doth leaue them onely to their first *Cause*; which if it be any thing weake will fall off. Besides, such *Excesses* doe Excite and Spur *Nature*, which thereupon riseth more forcibly against the *Disease*.

Experiment Solitary touching *Cure by Motion of Consent*. 63

THere is in the Body of Man a great *Consent* in the *Motion* of the seuerall Parts. Wee see, it is Childrens sport, to proue whether they can rub vpon their Breast with one hand, and pat vpon their Fore-head with another; And straight-wayes, they shall sometimes rub with both Hands, or pat with both Hands. Wee see, that when the Spirits, that come to the Nosthrils, expell a bad Sent, the Stomacke is ready to Expell

pell by Vomit. We finde that in *Conſumptions* of the *Lungs*, when Nature cannot expell by *Cough*, Men fall into *Fluxes* of the *Belly*, and then they dye. So in *Peſtilent Diſeaſes*, if they cannot bee expelled by *Sweat*, they fall likewiſe into *Looſeneſſe*, and that is commonly Mortall. Therefore *Phyſitians* ſhould ingeniouſly contriue, how by *Motions* that are in their *Power*, they may excite *Inward Motions* that are not in their *Power*, by *Conſent*; As by the *Stench* of *Feathers*, or the like, they cure the *Riſing* of the *Mother*.

Experiment Solitary touching *Cure of Diſeaſes which are contrary to Predispoſition.* 64

HIppocrates *Aphoriſme*. In *Morbis minus*, is a good profound *Aphoriſme*, It importeth, that *Diſeaſes*, contrary to the *Complexion*, *Age*, *Sex*, *Seaſon of the yeare*, *Diet*, &c. are more dangerous, than thoſe that are Concurrent. A man would thinke it ſhould bee otherwiſe; For that, when the *Accident of Sickneſſe*, and the *Naturall Diſpoſition*, doe ſecond the one the other, the *Diſeaſe* ſhould bee more forcible: And ſo (no doubt) it is; if you ſuppoſe like *Quantity of Matter*. But that, which maketh good the *Aphoriſme*, is; Becauſe ſuch *Diſeaſes* doe ſhew a greater *Collection of Matter*, by that they are able to ouercome thoſe *Naturall Inclinations* to the Contrary. And therefore in *Diſeaſes* of that kinde, let the *Phyſition* apply himſelfe more to *Purgation*, than to *Alteration*; Becauſe the Offence is in the *Quantity*; and the *Qualities* are rectified of themſelues.

Experiment Solitary touching *Preparations* before *Purging*, and *ſetting* of the *Body* afterward. 65

PHyſitians doe wiſely preſcribe, that there bee *Preparatiues* vſed before *Iuſt Purgations*; For certaine it is, that *Purgers* doe many times great Hurt, if the Body bee not accommodated, both before and after the *Purging*. The Hurt that they doe, for want of *Preparation* before *Purging*, is by the Sticking of the Humours, and their not comming faire away; Which cauſeth in the Body great Perturbations, and ill Accidents, during the *Purging*; And alſo, the diminiſhing, and dulling of the Working of the *Medicine* it ſelfe, that it purgeth not ſufficiently. Therefore the worke of *Preparation* is double; To make the *Humours Fluide*, and mature; And to make the *Paſſages* more open; For both thoſe helpe to make the Humours paſſe readily. And for the former of theſe; *Sirrups* are moſt profitable; And for the Latter, *Apozemes*, or *Preparing Broths*; *Cliſters* alſo helpe, leſt the *Medicine* ſtop in the Guts, and worke gripingly. But it is true, that *Bodies abounding* with *Humours*, And *Fat Bodies*; And *Open weather*; are *Preparatiues* in themſelues; becauſe they make the Humours more fluide. But let a *Phyſitian* beware, how hee purge after hard *Froſty weather*, and in a *Leane Body*, without *Preparation*. For the Hurt, that they may doe after *Purging*; It is cauſed by the *Lodging* of ſome *Humours* in *ill Places*: For it is certaine, that there bee *Humours*, which ſomewhere placed in the Body, are quiet, and doe little hurt; In other Places (eſpecially Paſſages) doe much miſchiefe. Therefore it is good, after *Purging*, to vſe *Apozemes*, and *Broths*, not ſo much *Opening* as thoſe vſed before *Purging*, but *Abſterſiue* and

Mundifying Cliſters alſo are good to conclude with, to draw away the Reliques of the Humours, that may haue deſcended to the *Lower Region* of the *Body*.

Experiment Solitary touching *Stanching of Bloud.* 66

Bloud is ſtanched diuers wayes. Firſt, by *Aſtringents*, and *Repercuſſiue Medicines*. Secondly, by *Drawing* of the *Spirits* and *Bloud inwards*; which is done by *Cold*; As *Iron*, or a *Stone* laid to the necke doth ſtanch the Bleeding at the Noſe; Alſo it hath beene tried, that the *Teſticles*, being put into ſharpe Vinegar, hath made a ſudden Receſſe of the Spirits, and ſtanched Bloud. Thirdly, by the *Receſſe of the Bloud by Sympathy*. So it hath beene tried, that the part that bleedeth, being thruſt into the Body of a Capon, or Sheepe, new ript and bleeding, hath ſtanched *Bloud*; The *Bloud*, as it ſeemeth, ſucking and drawing vp, by ſimilitude of ſubſtance, the *Bloud* it meeth with, and ſo it ſelfe going backe. Fourthly by Cuſtome and Time; So the Prince of *Aurange*, in his firſt hurt, by the *Spaniſh Boy*, could finde no meanes to ſtanch the *Bloud*, either by *Medicine* or *Ligament*; but was faine to haue the *Orifice* of the *Wound* ſtopped by *Mens Thumbs*, ſucceeding one another, for the ſpace at leaſt of two Dayes; And at the laſt the bloud by *Cuſtome* only retired. There is a fifth Way alſo in vſe, to let *Bloud* in an *Aduerſe Part*, for a *Reuulſion*.

Experiment Solitary touching *Change* of *Aliments* and *Medicines*. 67

It helpeth, both in *Medicine*, and *Aliment*, to Change and not to continue the ſame *Medicine*, and *Aliment* ſtill. The Cauſe is, for that *Nature* by continuall Vſe of any Thing, groweth to a *Saciety*, and *Dulneſſe*, either of *Appetite*, or *Working*. And we ſee that *Aſſuetude* of *Things Hurtfull* doth make them leeſe their force to Hurt; As *Poiſon*, which with vſe ſome haue brought themſelues to brooke. And therefore it is no maruell, though *Things helpfull*, by *Cuſtome*, leeſe their force to helpe. I count *Intermiſſion* almoſt the ſame thing with *Change*; For that, that hath beene intermitted, is after a ſort new.

Experiment Solitary touching *Diets*. 68

It is found by Experience, that in *Diets of Guaiacum*, *Sarza*, and the like (eſpecially if they bee ſtrict) the *Patient* is more troubled in the beginning, than after continuance; which hath made ſome of the more delicate Sort of Patients, giue them ouer in the middeſt; Suppoſing that if thoſe Diets trouble them ſo much at firſt, they ſhall not be able to endure them to the End. But the Cauſe is, for that all thoſe *Diets* doe dry vp *Humours*, *Rheumes*, and the like; And they cannot Dry vp vntill they haue firſt attenuated; And while the *Humour* is attenuated, it is more Fluid, than it was before, and troubleth the Body a great deale more, vntill it bee dried vp, and conſumed. And therefore *Patients* muſt expect a due time, and not checke at them at the firſt.

Experiments in Conſort touching the *Production* of *Cold*.

The *Producing* of *Cold* is a thing very worthy the Inquiſition; both for Vſe, and Diſcloſure of Cauſes. For *Heat* and

Cold

Cold are *Natures* two Hands, whereby ſhee chiefly worketh: And *Heat* we haue in readineſſe, in reſpect of the *Fire*; But for *Cold* wee muſt ſtay till it commeth; or ſeeke it in deepe Caues, or high Mountaines, And when all is done, we cannot obtaine it in any great degree: For *Furnaces* of *Fire* are farre hotter, than a *Summers Sunne*; But *Vaults*, or *Hils* are not much Colder than a *Winters Froſt*.

69 The firſt *Meanes* of *Producing Cold*, is that which *Nature* preſenteth vs withall; Namely the *Expiring of Cold* out of the *Inward parts of the Earth* in *winter*, when the Sunne hath no power to ouercome it; the *Earth* being (as hath beene noted by ſome) *Primum Frigidum*. This hath beene aſſerted as well by Ancient as by Moderne *Philoſophers*: It was the Tenet of *Parmenides*. It was the opinion of the *Author* of the diſcourſe in *Plutarch* (for I take it that Booke was not *Plutarchs* owne) *De primo Frigido*. It was the opinion of *Teleſius*, who hath renewed the *Philoſophy* of *Parmenides*, and is the beſt of the *Nouelliſts*.

70 The Second *Cauſe* of *Cold* is the *Contact* of *Cold Bodies*; For *Cold* is Actiue and Tranſitiue into Bodies Adiacent, as well as *Heat*: which is ſeene in thoſe things that are touched with *Snow* or *Cold Water*. And therefore whoſoeuer will be an *Inquirer* into *Nature*, let him reſort to a *Conſeruatory* of *Snow* and *Ice*; Such as they *vſe for delicacy*, to coole Wine in Summer: which is a Poore and Contemptible vſe, in reſpect of other vſes, that may be made of ſuch *Conſeruatories*.

71 The Third *Cauſe* is the *Primary Nature* of all *Tangible bodies*: For it is well to bee noted, that all Things whatſoeuer (*Tangible*) are of themſelues *Cold*; Except they haue an Acceſſory *Heat* by *fire*; *Life*; or *Motion*: For euen the *Spirit* of *Wine*, or *Chymicall Oiles*, which are ſo hot in Operation, are to the firſt Touch *Cold*; And *Aire* it ſelfe compreſſed, and Condenſed a little by blowing, is *Cold*.

72 The Fourth *Cauſe* is the *Denſity of the Body*; For all *Denſe Bodies* are *Colder* than moſt other *Bodies*; As *Metalls*, *Stone*, *Glaſſe*; And they are longer in *Heating* than *Softer Bodies*. And it is certaine, that *Earth*, *Denſe*, *Tangible*, hold all of the Nature of *Cold*. The Cauſe is, for that all *Matters Tangible* being *Cold*, it muſt needs follow, that where the *Matter* is moſt Congregate, the *Cold* is the greater.

73 The Fifth *Cauſe* of *Cold*, or rather of increaſe and vehemence of *Cold*, is a *Quicke Spirit incloſed in a Cold Body*: As will appeare to any that ſhall attentiuely conſider of *Nature* in many Inſtances. Wee ſee *Nitre* (which hath a *Quicke Spirit*) is Cold; more *Cold* to the Tongue, than a Stone; So *Water* is *Colder* than *Oile*, becauſe it hath a *Quicker Spirit*; For all *Oile*, though it hath the Tangible Parts better digeſted than *Water*, yet hath it a duller *Spirit*: So *Snow* is *Colder* than *Water*, becauſe it hath *more Spirit* within it: So we ſee that *Salt* put to *Ice* (as in the producing of the *Artificiall Ice*) increaſeth the *Actiuity* of *Cold*: So ſome *Inſects* which haue

Spirit of *Life*, as *Snakes*, and *Silkewormes*, are, to the touch *Cold*. So *Quick-filuer* is the *Coldeſt* of Mettals, becauſe it is *fulleſt of Spirit*.

74 The Sixth *Cauſe* of *Cold* is *the Chaſing and Driuing away of Spirits*, ſuch as haue ſome *Degree of Heat*: For the Baniſhing of the *Heat* muſt needs leaue any Body *Cold*. This wee ſee in the Operation of *Opium*, and *Stupefactiues*, vpon the Spirits of liuing Creatures: And it were not amiſſe to try *Opium*, by laying it vpon the Top of a *Weather-Glaſſe*, to ſee whether it will contract the *Aire*: But I doubt it will not ſucceed: For beſides that the Vertue of *Opium* will hardly penetrate thorow ſuch a Body as Glaſſe, I conceiue that *Opium*, and the like, make the *Spirits* flye rather by *Malignity*, than by *Cold*.

75 Seuenthly, the ſame *Effect* muſt follow vpon the *Exhaling* or *Drawing out of the Warme Spirits*, that doth vpon the Flight of the Spirits. There is an Opinion, that the *Moone* is Magnetical of *Heat*, as the *Sunne* is of *Cold* and *Moiſture*: It were not amiſſe therefore to try it, with *Warme-waters*; The one expoſed to the Beames of the *Moone*; the other with ſome Skreene betwixt the Beames of the *Moone* and the *Water*; As wee vſe to the *Sunne* for Shade; And to ſee whether the former will coole ſooner. And it were alſo good to enquire, what other Meanes there may bee, to draw forth the *Exile Heat*, which is in the *Aire*; for that may be a Secret of great Power to Produce *Cold Weather*.

Experiments in Conſort touching the *Verſion* and *Tranſmutation of Aire into Water*.

Wee haue formerly ſet downe the *Meanes of turning Aire into water*, in the *Experiment* 27. But becauſe it is *Magnale Naturæ*; And tendeth to the ſubduing of a very great effect; And is alſo of Manifold vſe; wee will adde ſome *Inſtances in Conſort* that giue light thereunto.

76 It is reported by ſome of the *Ancients*, that *Sailers* haue vſed, euery Night, to hang *Fleeces of Wooll* on the ſides of their *Ships*, the *Wooll* towards the water; And that they haue cruſhed freſh Water out of them, in the Morning, for their vſe. And thus much we haue tried, that a *Quantity* of *Wooll* tied looſe together, being let downe into a deepe *Well*; And hanging in the *Middle*, ſome three Fathome from the Water, for a night, in the Winter time; increaſed in weight, (as I now remember) to a fifth Part.

77 It is reported by one of the *Ancients*, that in *Lydia*. neere *Pergamus*, there were certaine *Worke-men*, in time of *Warres*, fled into *Caues*; And the Mouth of the *Caues* being ſtopped by the Enemies, they were famiſhed. But long time after the dead Bones were found; And ſome Veſſels which they had carried with them; And the Veſſels full of *Water*; And that *Water*, thicker, and more towards Ice, than Common *Water*: which is a Notable Inſtance of *Condenſation*, and *Induration*, by *Buriall vnder Earth*, (in Caues) for long time; And of *verſion* alſo (as it ſhould ſeeme) of *Aire* into *Water*; if any of thoſe Veſſels were Empty. Try therefore a ſmall *Bladder* hung in *Snow*; And the like in *Nitre*; And the like

like in *Quick-siluer*: And if you finde the *Bladders* fallen, or shrunke; you may be sure the *Aire* is condensed by the *Cold* of those *Bodies*; As it would be in a *Caue* vnder *Earth*.

It is reported of very good credit, that in the *East Indies*, if you set a Tub of *Water* open, in a Roome where *Cloues* are kept, it will bee drawne dry in foure and twenty houres; Though it stand at some distance from the *Cloues*. In the Countrey, they vse many times, in deceit, when their *Wooll* is new shorne, to set some Pailes of *Water* by, in the same Roome; to increase the weight of the *Wooll*: But it may bee, that the Heat of the *Wooll*, remaining from the body of the Sheepe; or the Heat gathered by the lying close of the *Wooll*, helpeth to draw the watry Vapour; But that is nothing to the *Version*. 78

It is reported also credibly, that *Wooll* new shorne, being laid casually vpon a *Vessell* of *Veriuyce*, after some time, had drunke vp a great part of the *Veriuyce*, though the Vessell were whole without any *Flaw*, and had not the Bung-hole open. In this instance, there is (vpon the by) to be noted the *Percolation*, or *Suing* of the *Veriuyce* thorow the wood; For *Veriuyce* of it selfe would neuer haue passed thorow the Wood; So as it seemeth, it must be first in a kinde of Vapour, before it passe. 79

It is especially to bee noted, that the Cause, that doth facilitate the *Version* of *Aire* into *water*, when the *Aire* is not in grosse, but subtilly mingled with *Tangible Bodies*, is, (as hath beene partly touched before,) for that *Tangible Bodies* haue an Antipathy with *Aire*; And if they finde any *Liquid Body*, that is more dense, neere them, they will draw it: And after they haue drawne it, they will condense it more and in effect incorporate it; For wee see that a *Spunge*, or *wooll*, or *Sugar*, or a *woollen Cloth*, being put but in part, in *water*, or *wine*, will draw the *Liquor* higher, and beyond the place, where the *water* or *wine* commeth. Wee see also, that *wood*, *Lute-strings*, and the like, doe swell in *moist Seasons*: As appeareth by the *Breaking* of the *Strings*, the *Hard Turning* of the *Pegs*, and the *Hard drawing forth of Boxes*, and *Opening* of *wainscot dooores*; which is a kinde of *Infusion*: And is much like to an *Infusion* in water, which will make wood to smell: As wee see in the Filling of the Chops of Boules, by laying them in Water. But for that part of these *Experiments*, which concerneth *Attraction*; wee will reserue it to the proper *Title* of *Attraction*. 80

There is also a *Version of Aire into Water*, seene in the *Sweating* of *Marbles*, and other *Stones*. And of *Wainscot* before and in moist weather: This must be, either by some *Moisture* the Body yeeldeth; Or else by the Moist Aire thickned against the hard body. But it is plaine, that it is the latter; For that wee see *Wood painted with Oyle Colour*, will sooner gather drops in a moist Night, than *Wood* alone: which is caused by the Smoothnesse and Closenesse: which letteth in no part of the Vapour, and so turneth it backe, and thickeneth it into Dew. Wee see also, that *Breathing* vpon a *Glasse*, or Smooth body, giueth a Dew. And in *Frosty Mornings* (such as we call *Rime Frosts*) you shall finde drops of Dew vpon 81

the

the Inside of Glasse-windowes ; And the *Frost* it selfe vpon the ground is but a *Version* or *Condensation*, of the Moist Vapours of the Night, into a watrie substance : *Dewes* likewise, and *Raine*, are but the Returnes of Moist Vapours Condensed ; The Dew, by the *Cold* onely of the Sunnes departure, which is the gentler *Cold* ; *Raines*, by the *Cold* of that, which they call the *Middle Region* of the *Aire* ; which is the more violent *Cold*.

82 It is is very probable (as hath beene touched) that that, which will turne *Water* into *Ice*, will likewise turne *Aire* Some Degree nearer vnto *Water*. Therefore try the *Experiment* of the *Artificiall Turning Water into Ice* (whereof we shall speake in another place) with *Aire* in place of *Water* and the *Ice* about it. And although it be a greater Alteration to turne *Aire* into *Water*, than *Water* into *Ice* : yet there is this Hope, that by Continuing the *Aire* longer time, the effect will follow ; For that Artificiall *Conuersion* of *water* into *Ice*, is the worke of a few Houres ; And this of *Aire* may be tried by a Moneths space, or the like.

Experiments in Consort touching *Induration of Bodies.*

Induration, or *Lapidification*, of Substances more soft, is likewise another degree of *Condensation* ; And is a great *Alteration* in Nature. The effecting and Accelerating thereof is very worthy to bee inquired. It is effected by three Meanes. The first is by *Cold* ; whose Property is to *Condense*, and constipate, as hath beene said. The Second is by *Heat* ; which is not proper but by consequence ; For the *Heat* doth attenuate ; And by Attenuation doth send forth the Spirit and moister Part of a Body ; And vpon that, the more grosse of the Tangible Parts doe contract and serre themselues together ; Both to auoid *Vacuum* (as they call it ;) And also to Munite themselues against the Force of the *Fire*, which they haue suffered. And the third is by *Assimilation* ; when a Hard Body Assimilateth a Soft, being contiguous to it.

The Examples of *Induration*, taking them promiscuously, are many : As the Generation of *Stones* within the Earth, which at the first are but Rude Earth, or Clay : And so of *Mineralls*, which come (no doubt) at first, of Iuyces Concrete, which afterward indurate : And so of *Porcellane*, Which is an *Artificiall Cement*, buried in the earth a long time : And so the Making of *Bricke*, and *Tile* : Also the Making of *Glasse*, of a certaine Sand, and Brake-Roots, and some other Matters : Also the *Exudations* of *Rock-Diamonds*, and *Crystall*, which harden

den with time: Also the *Induration* of *Bead-Amber*, which at first is a soft Substance; as appeareth by the *Flies*, and *Spiders*, which are found in it; And many more: But We will speake of them distinctly.

For *Indurations* by *Cold*, there be few Trials of it; For we haue no strong or intense *Cold* here on the Surface of the *Earth*, so neere the Beames of the Sunne, and the Heauens. The likeliest Triall is by *Snow*, and *Ice*; For as *Snow* and *Ice*, especially being holpen, and their *Cold* actiuated by *Nitre*, or *Salt*, will turne *Water* into *Ice*, and that in a few houres; So it may bee, it will turne *Wood*, or *Stiffe Clay*, into *Stone*, in longer time. Put therefore, into a *Conseruing Pit* of *Snow*, and *Ice*, (adding some quantity of *Salt*, and *Nitre*,) a Peece of *Wood*, or a Peece of *Tough Clay*, and let it lye a Moneth, or more. 83

Another Triall is by *Metalline waters*, which haue vertuall *Cold* in them. Put therefore *Wood*, or *Clay*, into *Smiths Water*, or other *Metalline Water*; And try whether it will not harden in some reasonable time. But I vnderstand it, of *Metalline Waters*, that come by Washing, or Quenching; And not of *Strong waters* that come by dissolution; for they are too Corosiue to consolidate. 84

It is already found, that there are some *Naturall Spring-Waters*, that will Inlapidate *Wood*; So as you shall see one peece of *Wood*, whereof the Part aboue the *Water* shall continue *Wood*; and the Part vnder the *Water* shall be turned into a kinde of *Grauelly Stone*; It is likely those *Waters* are of some *Metalline Mixture*; But there would bee more particular inquiry made of them. It is certaine that an *Egge* was found, hauing lien many yeares in the bottome of a Moat, where the Earth had somewhat ouergrowne it; And this Egge was come to the Hardnesse of a *Stone*; And had the Colours of the white and yolke perfect: And the Shell shining in small graines like Sugar, or Alablaster. 85

Another Experience there is of *Induration* by *Cold*, which is already found; which is, that *Metalls*, themselues are hardned by often *Heating* and *Quenching* in *Cold Water*: For *Cold* euer worketh most potently vpon *Heat* precedent. 86

For *Induration* by *Heat*, it must be considered, that *Heat*, by the Exhaling of the Moister Parts, doth either harden the Body; As in *Bricks*, *Tiles*, &c. Or if the *Heat* bee more fierce, maketh the grosser part it selfe; Run and Melt; As in the making of ordinary *Glasse*; And in the *Vitrification* of *Earth*, (As wee see in the inner Parts of *Furnaces*;) and in the *Vitrification* of *Brick*; And of *Metalls*. And in the former of these, which is the hardning by baking, without Melting, the *Heat* hath these degrees; First, it *Indurateth*; And then maketh *Fragile*; And lastly it doth *Incinerate* and *Calcinate*. 87

But if you desire to make an *Induration* with *Toughnesse*, and lesse Fragility; A middle way would be taken; Which is that which *Aristotle* hath well noted; But would bee throughly verified. It is to decoct *Bodies* in

in *Water*, for two or three dayes; But they must bee such Bodies, into which the *Water* will not enter; As *Stone*, and *Metall*. For if they be Bodies into which the *Water* will enter, then long Seething, will rather Soften than indurate them. As hath beene tried in *Eggs*, &c. Therefore, Softer *Bodies* must be put into Bottles; And the Bottles hung into Water seething, with the mouthes open, aboue the *Water*; that no *Water* may get in; For by this Meanes, the vertuall *Heat* of the *Water* will enter; And such a *Heat*, as will not make the Body aduſt, or fragile; But the Substance of the *Water* will be shut out. This *Experiment* wee made; And it sorted thus. It was tried with a Peece of *Free-stone*, and with *Pewter*, put into the *Water* at large. The *Free-stone* wee found receiued in some *Water*; For it was softer, and easier to scrape, than a peece of the same *Stone* kept dry. But the *Pewter* into which no *Water* could enter, became more white, and liker to Siluer, and lesse flexible, by much. There were also put into an Earthen Bottle, placed as before, a good Pellet of *Clay*, a Peece of *Cheese*, a Peece of *Chalke*, and a Peece of *Free-stone*. The *Clay* came forth almost of the Hardnesse of *Stone*. The *Cheese* likewise very hard, and not well to bee cut: The *Chalke* and the *Free-stone* much harder than they were. The colour of the *Clay* inclined not a whit to the Colour of *Bricke*, but rather to White, as in ordinary Drying by the Sunne. Note, that all the former Trialls were made by a Boyling vpon a good hot Fire, renewing the *Water* as it consumed, with other hot *Water*; But the Boyling was but for twelue houres onely; And it is like that the Experiment would haue beene more effectuall, if the Boyling had beene for two or three dayes, as we prescribed before.

89 As touching *Assimilation*, (for there is a degree of *Assimilation* euen in Inanimate Bodies) wee see examples of it in some *Stones* in *Clay-grounds*, lying neere to the top of the Earth, where *Pebble* is; In which you may manifestly see diuers *Pebbles* gathered together, and a Crust of *Cement* or *Stone* betweene them, as hard as the *Pebbles* themselues: And it were good to make a Triall of purpose, by taking *Clay*, and putting in it diuers *Pebble-stones*, thicke set, to see whether in continuance of time, it will not be harder than other *Clay* of the same lumpe, in which no *Pebbles* are set. We see also in Ruines of old Walls, especially towards the Bottome, the *Morter* will become as hard as the *Bricke*; wee see also, that the *Wood* on the sides of *Vessels* of *Wine*, gathereth a Crust of *Tartar*, harder than the *Wood* it selfe; And Scales likewise grow to the *Teeth*, harder than the *Teeth* themselues.

90 Most of all, *Induration* by *Assimilation* appeareth in the Bodies of *Trees* and *Liuing Creatures:* For no Nourishment that the *Tree* receiueth, or that the *Liuing Creature* receiueth, is so hard as *Wood*, *Bone*, or *Horne*, &c. but is *Indurated* after by *Assimilation*.

Experiment Solitary touching the *Version of Water into Aire.*

91 THe eye of the vnderstanding, is like the eye of the Sense: For as you may see great Obiects thorow small Crannies, or Leuells; So you may

may see great *Axiomes* of *Nature*, through small and Contemptible *Instances*. The *Speedy Depredation* of *Aire* vpon *Watry Moisture*, and *Version* of the same into *Aire*, appeareth in nothing more visible than in the sudden Discharge, or vanishing, of a little *Cloud* of *Breath*, or *Vapour* from *Glasse* or the *Blade* of a *Sword*, or any such Polished Body; Such as doth not at all Detaine, or Imbibe the Moisture; For the Mistinesse scattereth and breaketh vp suddenly. But the like *Cloud*, if it were *Oyly*, or *Fatty*, will not discharge; Not because it sticketh faster; But because *Aire* preyeth vpon *Water*; And *Flame*, and *Fire*, vpon *Oyle*; And therefore, to take out a Spot of Grease, they vse a *Coale* vpon browne Paper; because *Fire* worketh vpon Grease, or *Oyle*, as *Aire* doth vpon *Water*. And we see *Paper oyled* or *Wood oyled*, or the like, last long moist: but *Wet* with *Water*, dry, or putrifie sooner. The Cause is, for that *Aire* medleth little with the *Moisture* of *Oyle*.

Experiment Solitary touching the *Force of Vnion*. 92

THere is an Admirable demonstration, in the same trifling *Instance* of the *Little Cloud* vpon *Glasse*, or *Gemmes*, or *Blades* of *Swords*, of the *Force* of *Vnion*, euen in the least Quantities, and weakest Bodies, how much it conduceth to Preseruation of the present Forme; And the Resisting of a New. For marke well the Discharge of that *Cloud*; And you shall see it euer breake vp, first in the Skirts, and last in the middest. Wee see likewise, that much *Water* draweth forth the Iuyce of the Body Infused; But little water, is imbibed by the Body: And this is a Principall Cause, why in Operation vpon *Bodies*, for their *Version* or *Alteration*, the Triall in great Quantities, doth not answer the Triall in small; And so deceiueth many; For that (I say) the greater Body, resisteth more any Alteration of Forme, and requireth farre greater Strength in the Actiue Body, that should subdue it.

Experiment Solitary touching the *Producing of Feathers and Haires of diuers Colours*. 93

WE haue spoken before in the fifth *Instance*, of the Cause of *Orient Colours*, in *Birds*; which is by the Fineneſſe of the Strainer: we will now endeuour to reduce the same *Axiome* to a *Worke*. For this Writing of our *Silua Siluarum*, is (to speake properly) not *Naturall Historie*, but a high kinde of *Naturall Magicke*. For it is not a Description onely of Nature, but a Breaking of Nature, into great and strange Workes. Try therefore, the Anointing ouer of *Pigeons*, or other *Birds*, when they are but in their downe; Or of *Whelpes*, cutting their Haire as short as may bee; Or of some other Beast; with some ointment, that is not hurtfull to the Flesh; And that will harden, and sticke very close; And see whether it will not alter the Colours of the *Feathers*, or *Haire*. It is receiued, that the *Pulling* off, the first *Feathers* of *Birds*, cleane, will make the new come forth *white*: And it is certaine, that *white* is a penurious Colour, and where Moisture is scant. So *Blew Violets*, and other *Flowers*, if they bee starued, turne Pale and *White*; *Birds*, and *Horses*, by Age, or Scarres, turne *White*; And the *Hoare Haires* of Men; come by the same reason. And therefore in *Birds*, it is very likely, that the *Feathers* that come

come first, will bee many times of diuers Colours, according to the Nature of the *Bird*; For that the Skin is more porous; But when the Skin is more shut, and close, the Feathers will come *White*. This is a good *Experiment*, not only for the producing of *Birds*, and *Beasts* of strange Colours; but also for the Disclosure of the Nature of *Colours* themselues; which of them require a finer Porosity, and which a grosser.

Experiment Solitary touching the *Nourishment of Liuing Creatures before they be brought forth.*

94

IT is a worke of Prouidence, that hath beene truly obserued by some, That the *Tolke* of the *Egge*, conduceth little to the *Generation* of the *Bird*; But onely to the *Nourishment* of the same: For if a *Chicken* bee opened, when it is new hatched; you shall finde much of the *Tolke* remaining. And it is needfull, that *Birds*, that are shaped without the Females Wombe; haue in the *Egge*, as well Matter of Nourishment, as Matter of generation for the Body. For after the *Egge* is laid, and seuered from the Body of the *Hen*; It hath no more Nourishment from the *Hen*; but onely a quickning *Heat* when she sitteth. But Beasts, and Men need not the matter of Nourishment within themselues; because they are shaped within the Wombe of the Female, and are nourished continually from her Body.

Experiments in Consort touching *Sympathy and Antipathy for Medicinall vse.*

95

IT is an Inueterate and receiued Opinion, that *Cantharides* applied to any part of the Body, touch the *Bladder*, and exulcerate it, if they stay on long. It is likewise Receiued, that a kinde of *Stone*, which they bring out of the *West Indies*, hath a peculiar force to moue Grauell, and to dissolue the *Stone*; In so much, as laid but to the wrest, it hath so forcibly sent downe Grauell; as Men haue beene glad to remoue it; It was so violent.

96

It is receiued and confirmed by daily Experience, that the *Soales* of the *Feet* haue great Affinity with the *Head*, and the *Mouth* of the *Stomacke*: As we see, *Going wet-shod.* to those that vse it not, affecteth both: Applications of *hot Powders* to the *Feet* attenuate first, and after dry the *Rheume*: And therefore a *Physitian*, that would bee Mysticall, prescribeth, for the Cure of the *Rheume*, that a Man should walke Continually vpon a *Camomill Alley*; Meaning that hee should put *Camomill* within his Sockes. Likewise *Pigeons Bleeding*, applied to the *Soales* of the *Feet*, ease the *Head*. And *Soporiferous Medicines* applied vnto them, prouoke *Sleepe*.

97

It seemeth, that as the *Feet* haue a Sympathy with the *Head*; So the *Wrests* and *Hands*, haue a Sympathy with the *Heart*; We see the Affects and Passions of the *Heart*, and *Spirits*, are notably disclosed by the *Pulse*; And it is often tried, that Iuyces of *Stock-Gilli-flowers*, *Rose Campian*, *Garlicke*, and other things; applyed to the *Wrests*, and renewed; haue cured long *Agues*. And I conceiue, that washing with certaine *Liquors*, the *Palmes* of the *Hands*, doth much good: And they doe well in *Heats* of *Agues*, to hold in the Hands *Egges of Alablaster*, and *Bals* of *Crystall*.

Of these things we shall speake more, when we handle the Title *of* Sympathy *and* Antipathy, *in the proper Place.*

The

Experiment Solitary touching the *Secret Processes of Nature.* 98

The Knowledge of Man (hitherto) hath beene determined by the View, or Sight; So that whatsoeuer is Inuisible, either in respect of the *Fincnesse of the Body* it selfe; Or the *Smalnesse of the Parts*; Or of the *Subtilty of the Motion*; is little inquired. And yet these bee the Things that Gouerne Nature principally; And without which, you cannot make any true *Analysis* and Indication of the Proceedings of Nature. The *Spirits* or *Pneumaticals*, that are in all *Tangible Bodies*, are scarce knowne. Sometimes they take them for *Vacuum*; whereas they are the most Actiue of Bodies. Sometimes they take them for *Aire*, From which they differ exceedingly, as much as Wine from Water; And as Wood from Earth. Sometimes they will haue them to bee *Naturall Heat*, or a *Portion* of the *Element of Fire*; Whereas some of them are Crude and Cold. And sometimes they will haue them to bee the *Vertues* and *Qualities* of the *Tangible Parts*, which they see; whereas they are Things by themselues. And then, when they come to Plants and liuing Creatures, they call them *Soules*. And such Superficiall Speculations they haue; Like Prospectiues, that shew things inward, when they are but Paintings. Neither is this a Question of Words, but infinitely materiall in *Nature*. For *Spirits* are nothing else but a *Naturall Body*, rarified to a Proportion, and included in the *Tangible Parts* of *Bodies*, as in an Integument. And they be no lesse differing one from the other, than the *Dense* or *Tangible Parts*: And they are in all *Tangible Bodies* whatsoeuer, more or lesse; And they are neuer (almost) at rest: And from them, and their *Motions*, principally proceed *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, *Putrefaction*, *Viuification*, and most of the Effects of *Nature*: For, as wee haue figured them in our *Sapientiâ Veterum*, in the *Fable* of *Proserpina*, you shall in the Infernall Regiment heare little Doings of *Pluto*, but most of *Proserpina*: For *Tangible Parts* in *Bodies* are Stupide things; And the *Spirits*, doe (in effect) all. As for the differences of *Tangible Parts* in *Bodies*, the industry of the *Chymists* hath giuen some light, in discerning by their Separations, the *Oyly*, *Crude*, *Pure*, *Impure*, *Fine*, *Grosse Parts* of *Bodies*, and the like. And the *Physitians* are content to acknowledge, that *Herbs*, and *Drugs* haue diuers Parts; As that *Opium* hath a Stupefactiue Part, and a Heating Part; The one mouing Sleepe, the other a Sweat following; And that *Rubarb* hath Purging Parts, and Astringent Parts, &c. But this whole *Inquisition* is weakly and Negligently handled. And for the more subtill differences of the *Minute Parts*, and the Posture of them in the Body; (which also hath great Effects) they are not at all touched: As for the *Motions* of the *Minute Parts of Bodies*, which doe so great Effects, they haue not beene obserued at all, because they are Inuisible, and incurre not to the Eye; but yet they are to bee deprehended by Experience: As *Democritus* said well, when they charged him to hold, that the World was made of such little Moats, as were seene in the Sunne; *Atomus* (saith he) *necessitate Rationis & Experientiæ esse conuincitur: Atomum enim nemo voquam vidit.* And therefore the Tumult in the Parts of Solid Bodies, when they are compressed, which is the Cause of all

Flight of Bodies thorow the Aire, and of other *Mechanicall Motions*, (as hath beene partly touched before, and ſhall bee throughly handled in due place) is not ſeene at all. But neuertheleſſe, if you know it not, or enquire it not attentiuely and diligently, you ſhall neuer bee able to diſcerne, and much leſſe to produce a Number of *Mechanicall Motions*. Againe, as to the *Motions Corporall*, within the Encloſures of Bodies, whereby the Effects (which were mentioned before) paſſe betweene the *Spirits*, and the *Tangible Parts*; (which are, *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, *&c.*) they are not at all handled. But they are put off by the Names of *Vertues*, and *Natures*, and *Actions*, and *Paſſions*, and ſuch other *Logicall* Words.

Experiment Solitary touching the *Power of Heat*. 96

IT is certaine, that of all *Powers* in *Nature*, *Heat* is the chiefe; both in the Frame of *Nature*, and in the workes of *Art*. Certaine it is likewiſe, that the Effects of *Heat*, are moſt aduanced, when it worketh vpon a Body, without loſſe or diſſipation of the Matter; for that euer betrayeth the Account. And therefore it is true, that the power of *Heat* is beſt perceiued in *Diſtillations*, which are performed in cloſe Veſſells, and Receptacles. But yet there is a higher Degree; For howſoeuer *Diſtillations* doe keepe the Body in Cels, and Cloiſters, without Going abroad; yet they giue ſpace vnto Bodies to turne into Vapour; To returne into Liquor; and to Seperate one part from another. So as Nature doth Expatiate, although it hath not full Liberty whereby the true and Vltime Operations of *Heat* are not attained. But if Bodies may bee altered by *Heat*, and yet no ſuch Reciprocation of *Rarefaction*, and of *Condenſation*, and of *Separation*, admitted; then it is like that this *Proteus* of *Matter*, being held by the Sleeues, will turne and change into many *Metamorphoſes*. Take therefore a *Square Veſſell* of *Iron*, in forme of a Cube, and let it haue good thicke and ſtrong Sides. Put into it a Cube of *Wood*, that may fill it as cloſe as may be; And let it haue a Couer of Iron, as ſtrong (at leaſt) as the Sides; And let it bee well Luted, after the manner of the *Chymiſts*. Then place the *Veſſell* within burning *Coales*, kept quicke kindled, for ſome few houres ſpace. Then take the *Veſſell* from the *Fire*, and take off the Couer, and ſee what is become of the *Wood*. I conceiue that ſince all *Inflammation*, and *Euaporation* are vtterly prohibited, and the *Body* ſtill turned vpon it ſelfe; that one of theſe two effects will follow: Either that the *Body* of the *Wood* will bee turned into a kinde of *Amalagma*, (as the *Chymiſts* call it;) Or that the Finer Part will bee turned into *Aire*, and the Groſſer ſticke as it were baked, and incruſtate vpon the Sides of the *Veſſell*; being become of a Denſer Matter, than the *Wood* it ſelfe, Crude. And for another Triall, take alſo *Water*, and put it in the like Veſſell, ſtopped as before; But vſe a gentler *Heat*, and remoue the Veſſell ſometimes from the Fire; And againe, after ſome ſmall time when it is Cold, renue the *Heating* of it: And repeat this *Alteration* ſome few times: And if you can once bring to paſſe, that the *Water*, which is one of the Simpleſt of Bodies, bee changed in Colour, Odour, or Taſte

after

after the manner of Compound Bodies, you may bee sure that there is a great Worke wrought in Nature, and a notable Entrance made into strange Changes of Bodies, and productions: And also a Way made to doe that by Fire, in small time, which the Sun and Age doe in long time. But of the Admirable Effects of this *Distillation in Close*, (for so wee will call it) which is like the *Wombs* and *Matrices* of liuing creatures, where nothing Expireth, nor Separateth; We will speake fully, in the due place; Not that we Aime at the making of *Paracelsus Pigmey's*; Orany such Prodigious Follies; But that we know the Effects of *Heat* will be such, as will scarce fall vnder the Conceit of Man; If the force of it bee altogether kept in.

Experiment Solitary, touching the *Impossibility of Annihilation.*

100

THere is nothing more Certaine in Nature, than that it is impossible for any *Body*, to be vtterly *Annihilated*; But that, as it was the worke of the Omnipotency of God, to make *Somewhat* of *Nothing*; So it requireth the like Omnipotency, to turne *Somewhat* into *Nothing*. And therefore it is well said, by an Obscure Writer of the *Sect* of the *Chymists*; That there is no such way to effect the Strange *Transmutations* of *Bodies*, as to endevour and vrge by all meanes, the *Reducing* of them to *Nothing*. And herein is contained also a great Secret of Preseruation of Bodies from Change; For if you can prohibite, that they neither turne into *Aire*, because no *Aire* commeth to them; Nor goe into the *Bodies Adiacent*, because they are vtterly Heterogeneall; Nor make a *Round* and *Circulation* within themselues; they will neuer Change, though they bee in their Nature neuer so Perishable, or Mutable. Wee see, how *Flies*, and *Spiders*, and the like, get a *Sepulcher* in *Amber*, more Durable, than the *Monument*, and *Embalming* of the *Body* of any *King*. And I conceiue the like will be of *Bodies* put into *Quick-siluer*. But then they must be but thin; As a leafe, or a Peece of Paper, or Parchment; For if they haue a greater Crassitude, they will alter in their owne Body, though they spend not. But of this we shall speake more, when we handle the *Title* of *Conseruation* of *Bodies*.

NATVRALL HISTORIE.

II. Century.

MVsick in the *Practice*, hath beene well purſued; And in good Variety; But in the *Theory*, and eſpecially in the *Yeelding* of the *Cauſes* of the *Practique*, very weakly; Being reduced into certaine Myſticall Subtilties, of no vſe, and not much Truth. Wee ſhall therefore after our manner, ioyne the *Contemplatiue* and *Actiue Part* together.

Experiments in *Conſort* touching *Muſicke*.

All *Sounds*, are either *Muſicall Sounds*, which we call *Tones*; Whereunto there may be an *Harmony*; which *Sounds* are euer *Equall*; As *Singing*, the *Sounds of Stringed, and Wind-Inſtruments*, the *Ringing of Bels*, &c. Or *Immuſicall Sounds*; which are euer *Vnequall*; Such as are the *Voice in Speaking*, all *Whiſperings*, all *Voices of Beaſts and Birds*, (except they bee *Singing Birds*;) all *Percuſſions*, of *Stones*, *Wood*, *Parchment*, *Skins*, (as in *Drums*;) and infinite others. 101

The *Sounds* that produce *Tones*, are euer from ſuch *Bodies*, as are in their Parts and Pores *Equall*; As well as the *Sounds* themſelues are *Equall*; And ſuch as are the *Percuſſions* of *Mettall*, as in *Bels*; Of *Glaſſe*, as in the Fillipping of a *Drinking Glaſſe*; Of *Aire*, as in *Mens voices whileſt they Sing*, in *Pipes*, *Whiſtles*, *Organs*, *Stringed inſtruments*, &c. And of *Water*: as in the *Nightingale-pipes* of *Regalls*, or *Organs*, and other *Hydraulickes*; 102

which the *Ancients* had, and *Nero* did ſo much eſteeme, but are now loſt. And if any Man thinke, that the *String* of the *Bow*, and the *String* of the *Viall*, are neither of them *Equall Bodies*; And yet produce *Tones*; he is in an errour. For the *Sound* is not created betweene the *Bow* or *Plectrum*, and the *String*; but betweene the *String* and the *Aire*; No more than it is betweene the *Finger* or *Quill*, and the *String*, in other *Inſtruments*. So there are (in effect) but three *Percuſſions* that create *Tones*; *Percuſſions* of *Metalls* (comprehending *Glaſſe*, and the like;) *Percuſſions* of *Aire*; and *Percuſſions* of *Water*.

103 The *Diapaſon* or *Eight* in *Muſicke* is the ſweeteſt *Concord*; Inſomuch, as it is in effect an *Vniſon*; As wee ſee in *Lutes*, that are ſtrung in the Baſe *Strings* with two ſtrings, one an *Eight* aboue another; Which make but as one *Sound*. And euery *Eighth Note* in Aſcent (as from *Eight* to *Fifteene*, from *Fifteene* to *twenty two*, and ſo *in infinitum*,) are but *Scales of Diapaſon*. The *Cauſe* is darke, and hath not beene rendred by any; And therefore would be better contemplated. It ſeemeth that Aire, (which is the Subiect of *Sounds*) in *Sounds* that are not *Tones* (which are all *vnequall*, as hath beene ſaid) admitteth much Variety; As wee ſee in the *Voices* of *Liuing Creatures*; And likewiſe in the *Voices* of ſeuerall *Men*; (for we are capable to diſcerne ſeuerall *Men* by their *Voices*;) and in the *Coniugation of Letters*; whence *Articulate Sounds* proceed; Which of all others are moſt various. But in the Sounds which we call *Tones*, (that are ever *Equall*) the *Aire* is not able to caſt it ſelfe into any ſuch variety; But is forced to recurre into one and the ſame Poſture or Figure, onely differing in Greatneſſe and Smalneſſe. So we ſee *Figures* may be made of lines, Crooked and Streight in infinite Variety, where there is Inequality; But *Circles*, or *Squares*, or *Triangles Equilaterall* (which are all *Figures*, of equall lines) can differ but in Greater, or Leſſer.

104 It is to bee noted (the rather leſt any Man ſhould thinke, that there is any thing in this number of *Eight*, to create the *Diapaſon*) that this Computation of *Eight*, is a thing rather receiued, than any true Computation. For a true Computation ought euer to bee, by Diſtribution into equall Portions. Now there bee interuenient in the *Riſe of Eight* (in *Tones*) two *Beemolls*, or *Halfe notes*; So as if you diuide the *Tones* equally, the *Eight* is but ſeuen whole and equall *Notes*; And if you ſubdiuide that into *Halfe Notes* (as it is in the Stops of a *Lute*) it maketh the *Number* of *Thirteene*.

105 Yet this is true; That in the ordinary Riſes and Falls of the *Voice* of *Man* (not meaſuring the *Tone* by whole Notes, and halfe Notes, which is the Equall Meaſure;) there fall out to bee two Beemols (as hath beene ſaid) betweene the *Vniſon* and the *Diapaſon*: And this Varying is naturall. For if a Man would endeuour to raiſe or fall his *Voice*, ſtill by *Halfe-notes*, like the Stops of a *Lute*; or by whole *Notes* alone, without *Halfes*; as farre as an *Eight*; he will not be able to frame his *Voice* vnto it. Which ſheweth that after euery three whole *Notes* Nature requireth, for all Harmonicall vſe, one *Halfe-Note* to be interpoſed.

106 It is to bee conſidered, that whatſoeuer Vertue is in *Numbers*, for Conducing

Conducing to Consent of *Notes*, is rather to bee ascribed to the *Ante-Number*, than to the *Entire Number*; As namely, that the Sound returneth after *Six*, or after *Twelue*; So that the *Seuenth*, or the *Thirteenth*; is not the Matter, but the *Sixth*, or the *Twelfth*; And the *Seuenth* and the *Thirteenth* are but the limits and Boundaries of the *returne*.

The *Concords* in *Musicke* which are *Perfect*, or *Semiperfect*, betweene the *Vnison*, and the *Diapason*, are the *Fifth*, which is the most *Perfect*; the *Third* next; and the *Sixth* which is more harsh: And as the Ancients esteemed, and so doe my selfe and some Other yet, the *Fourth* which they call *Diatessaron*. As for the *Tenth*, *Twelfth*, *Thirteenth*, and so *in infinitum*; they be but *Recurrences* of the Former; viz. of the *Third*, the *Fifth*, and the *Sixth*, being an *Eight* respectiuely from them. 107

For *Discords*, the *Second*, and the *Seuenth*, are of all others the most odious, in *Harmony*, to the *Sense*; whereof the One is next aboue the *Vnison*, the Other next vnder the *Diapason*: which may shew, that *Harmony* requireth a competent distance of *Notes*. 108

In *Harmony*, if there bee not a *Discord* to the *Base*, it doth not disturbe the *Harmony*, though there bee a *Discord* to the *Higher Parts*; So the *Discord* bee not of the Two that are Odious; And therefore the ordinary *Consent* of *Foure Parts* consisteth of an *Eight*, a *Fifth*, and a *Third* to the *Base*: But that *Fifth* is a *Fourth* to the *Treble*, and the *Third* is a *Sixth*. And the *Cause* is, for that the *Base* striking more Aire, doth ouercome and drowne the *Treble*, (vnlesse the *Discord* bee very Odious;) And so hideth a small Imperfection. For we see, that in one of the *Lower strings* of a *Lute*, there soundeth not the Sound of the *Treble*, nor any *Mixt Sound*, but onely the *Sound* of the *Base*. 109

Wee haue no *Musicke* of *Quarter-Notes*; And it may bee, they are not capable of *Harmony*; For wee see the *Halfe-Notes* themselues doe but interpose sometimes. Nevertheless we haue some *Slides*, or *Relishes*, of the Voice, or Strings, as it were continued without *Notes*, from one *Tone* to another, rising or falling, which are delightfull. 110

The Causes of that which is *Pleasing*, or *Ingrate* to the *Hearing*, may receiue light by that, which is *Pleasing* or *Ingrate* to the *Sight*. There bee two Things Pleasing to the Sight, (leauing *Pictures*, and *Shapes* aside, which are but Secondary Obiects; And please or displease but in Memory;) these two are, *Colours*, and *Order*. The Pleasing of *Colour* symbolizeth with the *Pleasing* of any *Single Tone* to the *Eare*; But the Pleasing of *Order* doth symbolize with *Harmony*. And therefore wee see in *Garden-knots*, and the *Frets of Houses*, and all equall and well answering *Figures*, (as *Globes*, *Pyramides*, *Cones*, *Cylinders*, &c.) how they please; whereas *vnequall Figures* are but Deformities. And both these *Pleasures*, that of the *Eye*, and that of the *Eare*, are but the Effects of *Equality*: *Good Proportion*, or *Correspondence*: So that (out of *Question*,) *Equality*, and *Correspondence*, are the *Causes* of *Harmony*. But to finde the *Proportion* of that *Correspondence*, is more abstruse; whereof notwithstanding wee shall speake somewhat, (when we handle *Tones*,) in the generall Enquiry of *Sound*. 111

Tones

112 *Tones* are not ſo apt altogether to procure *Sleepe*, as ſome other *Sounds*; As the *Winde*, the *Purling of Water*, *Humming of Bees*, a *Sweet Voice* of one that readeth, &c. The *Cauſe* whereof is, for that *Tones*, becauſe they are Equall, and ſlide not, doe more ſtrike and erect the Senſe, than the other. And Ouer-much Attention hindereth *Sleepe*.

113 There bee in *Muſicke* certaine *Figures*, or *Tropes*; almoſt agreeing with the *Figures* of *Rhetoricke*; And with the *Affections* of the *Minde*, and other *Senſes*. Firſt, the *Diuiſion* and *Quauering*, which pleaſe ſo much in *Muſicke*, haue an Agreement with the *Glittering* of *Lights*; As the *Moone-Beames* playing vpon a Waue. Againe, the *Falling* from a *Diſcord* to a *Concord*, which maketh great Sweetneſſe in *Muſicke*, hath an Agreement with *Affections*, which are reintigrated to the better, after ſome diſlikes: It agreeth alſo with the *Taſte*, which is ſoone glutted with that which is ſweet alone. The *Sliding from the Cloſe or Cadence*, hath an Agreement with the *Figure* in *Rhetoricke*, which they call *Preter Expectatum*; For there is a Pleaſure euen in *Being deceiued*. The *Reports* and *Fuges*, haue an Agreement with the *Figures* in *Rhetoricke*, of *Repetition*, and *Traduction*. The *Tripla's*, and *Changing of Times*, haue an Agreement with the *Changes of Motions*; As when *Galliard Time*, and *Meaſure Time*, are in the *Medley*, of one *Dance*.

114 It hath beene anciently held, and obſerued, that the *Senſe of Hearing*, and the *Kindes of Muſicke*, haue moſt Operation vpon *Manners*; As to Incourage Men, and make them Warlike; To make them Soft and Effeminate; To make them Graue; To make them Light; To make them Gentle and inclined to Pity, &c. The *Cauſe* is, for that the *Senſe of Hearing* ſtriketh the *Spirits* more immediately, than the other *Senſes*; And more incorporeally than the *Smelling*: For the *Sight*, *Taſte*, and *Feeling*, haue their Organs, not of ſo preſent and immediate Acceſſe to the *Spirits*, as the *Hearing* hath. And as for the *Smelling*, (which indeed worketh alſo immediatly vpon the *Spirits*, and is forcible while the Obiect remaineth,) it is with a Communication of the Breath, or Vapour of the *Obiect Odorate*: But *Harmony* entring eaſily, and Mingling not at all, and Comming with a Manifeſt Motion; doth by Cuſtome of often Affecting the *Spirits*, and Putting them into one kinde of Poſture, alter not a little the Nature of the *Spirits*, euen when the Obiect is remoued. And therefore wee ſee, that *Tunes* and *Aires*, euen in their owne Nature, haue in themſelues ſome Affinity with the *Affections*; As there bee *Merry Tunes*, *Dolefull Tunes*, *Solemne Tunes*; *Tunes inclining Mens Mindes to Pity*; *Warlike Tunes*; &c. So as it is no Maruell, if they alter the *Spirits*; Conſidering that *Tunes* haue a Prediſpoſition to the *Motion* of the *Spirits* in themſelues. But yet it hath beene noted, that though this variety of *Tunes*, doth diſpoſe the *Spirits* to variety of Paſſions, conforme vnto them; yet generally, *Muſicke* feedeth that diſpoſition of the *Spirits* which it findeth. Wee ſee alſo that ſeuerall *Aires*, and *Tunes*, doe pleaſe ſeuerall *Nations*, and *Perſons*, according to the Sympathy they haue with their *Spirits*.

Experiments in Consort, touching *Sounds*; and first touching the *Nullity and Entity of Sounds.*

Perſpective hath beene with ſome diligence inquired; And ſo hath the *Nature* of *Sounds*, in ſome ſort, as farre as concerneth *Muſicke*. But the *Nature of Sounds* in generall, hath beene ſuperficially obſerued. It is one of the ſubtilleſt Peeces of Nature. And beſides, I practiſe, as I doe aduiſe: which is, after long Inquiry of Things, Immerſe in Matter, to interpoſe ſome Subiect, which is Immateriate, or leſſe Materiate; Such as this of *Sounds*: To the end, that the *Intellect* may be Rectified, and become not Partiall.

It is firſt to bee conſidered, what *Great Motions* there are in Nature, which paſſe without *Sound*, or *Noiſe*. The *Heauens* turne about, in a moſt rapide Motion, without *Noiſe* to vs perceiued; Though in ſome *Dreames* they haue beene ſaid to make an excellent *Muſicke*. So the *Motions* of the *Comets*, and *Fiery Meteors* (as *Stella Cadens*, &c.) yeeld no *Noiſe*. And if it bee thought, that it is the Greatneſſe of diſtance from vs, whereby the *Sound* cannot bee heard; Wee ſee that *Lightnings*, and *Corruſcations*, which are neere at hand, yeeld no *Sound* neither. And yet in all theſe, there is a Percuſſion and Diuiſion of the *Aire*. The *Winds* in the *Vpper Region* (which moue the *Clouds* aboue (which wee call the *Racke*) and are not perceiued below) paſſe without *Noiſe*. The *Lower Winds* in a plaine, except they bee ſtrong, make no *Noiſe*; But amongſt Trees, the *Noiſe* of ſuch *Winds* will bee perceiued. And the *winds* (generally) when they make a *Noiſe*, doe euer make it vnequally, Riſing and Falling, and ſometimes (when they are vehement) Trembling at the Height of their Blaſt. *Raine*, or *Haile* falling, (though vehemently,) yeeldeth no *Noiſe*, in paſſing thorow the *Aire*, till it fall vpon the Ground, Water, Houſes, or the like. *Water* in a *Riuer* (though a ſwift Streame) is not heard in the Channell, but runneth in Silence, if it bee of any depth; But the very *Streame* vpon *Shallowes*, of Grauell, or Pebble, will bee heard. And *Waters*, when they beat vpon the Shore, or are ſtraitned, (as in the falls of Bridges;) Or are daſhed againſt themſelues by *Winds*, giue a Roaring *Noiſe*. Any *peece of Timber*, or *Hard Bodie*, being thruſt forwards by another Body Contiguous, without knocking, giueth no *Noiſe*. And ſo *Bodies* in weighing, one vpon another, though the *vpper Body* preſſe the *Lower Body* downe, make no *Noiſe*. So the *Motion* in the *Minute Parts* of any *Solide Body*, (which is the Principall Cauſe of *Violent Motion*, though vnobſerued;) paſſeth without *Sound*; For that *Sound*, that is heard ſometimes, is produced onely by the Breaking of the *Aire*; And not by the Impulſion of the Parts. So it is manifeſt; That where the Anteriour Body giueth way, as faſt as the Poſteriour commeth on, it maketh no *Noiſe*; be the *Motion* neuer ſo great or ſwift. 115

Aire open, and at *Large*, maketh no *Noiſe*, except it bee ſharply perCuſſed; As in the *Sound* of a String, where *Aire* is percuſſed by a hard, 116

and

and Stiffe Body; And with a sharpe looſe; For if the String bee not strained, it maketh no *Noiſe*. But where the *Aire is pent*, and straitned, there Breath or other Blowing, (which carry but a gentle Percuſſion) ſuffice to create *Sound*; As in *Pipes*, and *Wind-Inſtruments*. But then you muſt note, that in *Recorders*, which goe with a gentle Breath, the *Concaue* of the *Pipe*, were it not for the *Fipple*, that straitneth the Aire (much more than the *Simple Concaue*;) would yeeld no *Sound*. For as for other *Wind-Inſtruments*, they require a forcible Breath; As *Trumpets*, *Cornets*, *Hunters Hornes*, &c. Which appeareth by the blowne cheekes of him that windeth them. *Organs* alſo are blowne with a ſtrong winde, by the Bellowes. And note againe, that ſome kinde of *Wind-Inſtruments*, are blowne at a ſmall Hole in the ſide, which straitneth the Breath at the firſt Entrance; The rather in reſpect of their *Trauerſe*, and *Stop* aboue the Hole, which performeth the *Fipples* Part; As it is ſeene in *Flutes*, and *Fifes*, which will not giue *Sound*, by a Blaſt at the end, as *Recorders*, &c. doe. Likewiſe in all *Whiſtling*, you contract the Mouth; And to make it more ſharpe, Men ſometimes vſe their Finger. But in *Open Aire*, if you throw a Stone, or a Dart, they giue no Sound: No more doe *Bullets*, except they happen to bee a little hollowed in the Caſting; Which Hollowneſſe penneth the *Aire*: Nor yet *Arrowes*, except they be ruffled in their Feathers, which likewiſe penneth the *Aire*. As for *Small Whiſtles*, or *Shepherds Oaten Pipes*; they giue a *Sound*, becauſe of their extreme Slenderneſſe, whereby the *Aire* is more pent, than in a Wider *Pipe*. Againe, the *Voices* of *Men*, and Liuing Creatures, paſſe thorow the throat, which penneth the Breath. As for the *Iewes Harpe*, it is a ſharpe Percuſſion; And beſides, hath the vantage of penning the *Aire* in the Mouth.

117 *Solide Bodies*, if they be *very ſoftly percuſſed*, giue no *Sound*; As when a man treadeth very ſoftly vpon *Boards*. So *Cheſts* or *Doores* in faire weather, when they open eaſily, giue no *Sound*. And *Cart-wheeles* ſqueake not when they are liquored.

118 The *Flame of Tapers*, or *Candles*, though it be a ſwift Motion, and breaketh the *Aire*, yet paſſeth without *Sound*. *Aire in Ouens*, though (no doubt) it doth (as it were) boyle, and dilate it ſelfe, and is repercuſſed; yet it is without *Noiſe*.

119 *Flame percuſſed by Aire*, giueth a *Noiſe*; As in Blowing of the Fire by Bellowes; Greater, than if the Bellowes ſhould blow vpon the *Aire* it ſelfe. And ſo likewiſe *Flame percuſſing the Aire ſtrongly*, (as when Flame ſuddenly taketh, and openeth,) giueth a *Noiſe*; So, Great *Flames*, whiles the one impelleth the other, giue a bellowing *Sound*.

120 There is a Conceit runneth abroad, that there ſhould bee a *White Powder*, which will diſcharge a Peece without *Noiſe*; which is a dangerous Experiment, if it ſhould bee true: For it may cauſe ſecret Murthers. But it ſeemeth to mee vnpoſſible; For, if the *Aire pent*, bee driuen forth and ſtrike the *Aire open*, it will certainely make a *Noiſe*. As for the *White Powder* (if any ſuch thing bee, that may extinguiſh, or dead the *Noiſe*,)

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it is like to be a Mixture of *Petre*, and *Sulphur*, without *Coale*. For *Petre* alone will not take Fire. And if any man thinke, that the *Sound* may bee extinguished, or deaded, by discharging the *Pent Aire*, before it commeth to the *Mouth* of the *Peece*, and to the *Open Aire*; That is not probable; For it will make more diuided *Sounds*: As if you should make a Crosse Barrell hollow, thorow the Barrell of a Peece, it may be, it would giue seuerall Sounds, both at the Nose, and at the sides. But I conceiue, that if it were possible, to bring to passe, that there should bee no *Aire* pent at the Mouth of the Peece, the Bullet might flye with small, or no *Noise*. For first it is certaine, there is no *Noise* in the Percussion of the *Flame* vpon the *Bullet*. Next the *Bullet*, in piercing thorow the *Aire*, maketh no *Noise*; As hath beene said. And then, if there be no *Pent Aire* that striketh vpon *Open Aire*, there is no Cause of *Noise*; And yet the Flying of the *Bullet* will not be stayed. For that *Motion* (as hath beene oft said) is in the Parts of the *Bullet*, and not in the *Aire*. So as triall must be made by taking some small *Concaue* of *Metall*, no more than you meane to fill with powder; And laying the Bullet in the Mouth of it, halfe out into the *Open Aire*.

I heard it affirmed by a Man, that was a great Dealer in Secrets, but he was but vaine; That there was a *Conspiracy* (which himselfe hindred,) to haue killed *Queene Mary*, Sister to *Queene Elizabeth*, by a *Burning glasse*, when she walked in *Saint Iames* Parke, from the Leads of the House. But thus much (no doubt) is true; That if *Burning-Glasses* could be brought to a great strength, (as they talke generally of *Burning-Glasses*, that are able to burne a *Nauy*.) the *Percussion* of the *Aire* alone, by such a *Burning glasse*, would make no *Noise*; No more than is found in *Coruscations*, and *Lightnings*, without *Thunders*. 121

I suppose, that *Impression* of the *Aire* with *Sounds*, asketh a time to be conueighed to the *Sense*; As well as the *Impression* of *Species visible*: Or else they will not be heard. And therefore as the Bullet *moueth* so *swift*, that it is *Inuisible*; So the same *Swiftnesse* of *Motion* maketh it *Inaudible*: For wee see, that the Apprehension of the *Eye*, is quicker than that of the *Eare*. 122

All *Eruptions of Aire*, though small and slight; giue an *Entity of Sound*; which wee call *Crackling*, *puffing*, *Spitting*, &c. As in *Bay-salt*, and *Bay-leaues*, cast into the Fire; So in *Chesnuts*, when they leape forth of the Ashes; So in *Greene Wood*, laid vpon the Fire, especially *Roots*, So in *Candles* that spit Flame, if they bee wet; So in *Rasping*, *Sneezing*, &c. So in a *Rose Leafe* gathered together into the fashion of a Purse, and broken vpon the Fore-head, or Backe of the Hand, as Children vse. 123.

THE *Cause* giuen of *Sound*, that it should be an *Elision* of the *Aire* (whereby, if they meane any thing, they meane a *Cutting*, or *Dividing* or else an *Attenuating* of the *Aire*) is but a Terme of Ignorance; And the Motion is but a Catch of the Wit vpon a few Instances; As the Manner is in the *Physolophy* Receiued. And it is common with Men, that if they haue' Experiments in Consort touching *Production*, *Conseruation*, and *Deliuery of Sounds*; And the *Office*

of the Aire therein. 124

haue gotten a Pretty *Expreſſion*, by a *Word* of *Art*, that *Expreſſion* goeth currant; though it bee empty of *Matter*. This Conceit of *Eliſion*, appeareth moſt manifeſtly to bee falſe, in that the *Sound* of a *Bell*, *ſtring*, or the like, continueth melting, ſome time, after the *Percuſſion*; But ceaſeth ſtreight-waves, if the *Bell*, or *String*, be touched and ſtayed; whereas, if it were the *Eliſion* of the *Aire*, that made the *Sound*, it could not bee, that the Touch of the *Bell*, or *String*, ſhould extinguiſh ſo ſuddenly that Motion, cauſed by the *Eliſion* of the *Aire*. This appeareth yet more manifeſtly, by *Chiming* with a Hammer, vpon the Out-ſide of a *Bell*; For the *Sound* will be according to the inward Concaue of the *Bell*; whereas the *Eliſion*, or *Attenuation* of the *Aire*, cannot bee but onely betweene the *Hammer*, and the Out-ſide of the *Bell*. So againe, if it were an *Eliſion*, a broad *Hammer*, and a *Bodkin*, ſtrucke vpon Metall, would giue a diuers *Tone*; As well as a diuers *Loudneſſe*: But they doe not ſo; For though the *Sound* of the one bee *Louder*, and of the other *Softer*, yet the *Tone* is the ſame. Beſides, in *Eccho's*, (whereof ſome are as loud as the *Originall Voice*,) there is no new *Eliſion*; but a *Repercuſſion* onely. But that which conuinceth it moſt of all, is, that *Sounds* are generated, where there is no *Aire* at all. But theſe and the like Conceits, when Men haue cleared their vnderſtanding, by the light of Experience, will ſcatter, and breake vp like a Miſt.

125 It is certaine, that *Sound* is not produced at the firſt, but with ſome *Locall Motion* of the *Aire*, or *Flame*, or ſome other *Medium*; Nor yet without ſome *Reſiſtance*, either in the *Aire*, or the *Body Percuſſed*. For if there bee a meere Yeelding, or Ceſſion, it produceth no *Sound*; As hath beene ſaid. And therein *Sounds* differ from *Light*, and Colours; which paſſe thorow the *Aire*, or other *Bodies*, without any *Locall Motion* of the *Aire*; either at the firſt, or after. But you muſt attentiuely diſtinguiſh, betweene the *Locall Motion* of the *Aire*, (which is but *Vehiculum Cauſæ*, *A Carrier of the Sounds*,) and the *Sounds* themſelues, Conueighed in the *Aire*. For as to the former, wee ſee manifeſtly, that no *Sound* is produced (no not by *Aire* it ſelfe againſt other *Aire*, as in *Organs*, &c.) but with a perceptible *Blaſt* of the *Aire*; And with ſome *Reſiſtance* of the *Aire* ſtrucken. For euen all *Speech*, (which is one of the gentleſt *Motions* of *Aire*,) is with expulſion of a little *Breath*. And all *Pipes* haue a Blaſt, as well as a *Sound*. Wee ſee alſo manifeſtly, that *Sounds* are carried with *Winde*: And therefore *Sounds* will bee heard further with the *Winde*, than againſt the *Winde*; And likewiſe doe riſe and fall with the Intenſion or Remiſſion of the *Winde*. But for the *Impreſſion* of the *Sound*, it is quite another Thing; And is vtterly without any *Locall Motion* of the *Aire*, Perceptible; And in that reſembleth the *Species viſible*: For after a *Man* hath lured, or a *Bell* is rung, wee cannot diſcerne any *Perceptible Motion* (at all) in the *Aire*, as long as the *Sound* goeth; but onely at the firſt. Neither doth the *Wind* (as farre as it carrieth a *Voice*,) with the *Motion* thereof, confound any of the Delicate, and Articulate Figurations of the *Aire*, in Variety of Words. And if a *Man* ſpeake a good loudneſſe, againſt the

the *Flame* of a *Candle*, it will not make it tremble much; though most, when those *Letters* are pronounced, which contract the Mouth; As *F*, *S*, *V*, and some others. But *Gentle Breathing*, or *Blowing* without *speaking*, will moue the *Candle* farre more. And it is the more probable, that *Sound* is without any *Locall Motion* of the *Aire*, because as it differeth from the *Sight*, in that it needeth a *Locall Motion* of the *Aire* at first; So it paralleleth in so many other things with the *Sight*, and *Radiation of things visible*; Which (without all question) induce no *Locall Motion* in the *Aire*, as hath beene said.

126 Neuertheless it is true, that vpon the *Noise* of *Thunder*, and great *Ordnance*; Glasse windowes will shake; and Fishes are thought to bee fraied with the Motion, caused by *Noise* vpon the Water. But these Effects are from the Locall Motion of the *Aire*, which is a Concomitant of the *Sound* (as hath beene said;) and not from the *Sound*.

127 It hath beene anciently reported, and is still receiued, that *Extreme Applauses*, and *Shouting of People* assembled in great Multitudes, haue so rarified, and broken the Aire, that *Birds* flying ouer, haue falne downe, the Aire being not able to support them. And it is beleeued by some, that *Great Ringing of Bels* in populous Cities, hath chased away *Thunder*: and also dissipated Pestilent Aire: All which may be also from the Concussion of the Aire, and not from the *Sound*.

128 A very great *Sound*, neere hand, hath strucken many *Deafe*; And at the Instant they haue found, as it were, the breaking of a Skin or Parchment in their Eare: And my selfe standing neere on that *Lured* loud, and shrill, had suddenly an Offence, as if somewhat had broken, or beene dislocated in my *Eare*; And immediately after, a *loud Ringing*; (Not an ordinary Singing, or Hissing, but farre louder, and differing;) so as I feared some *Deafenesse*. But after some halfe Quarter of an Houre it vanished. This Effect may be truly referred vnto the *Sound*: For (as is commonly receiued) an *ouer-potent Obiect* doth destroy the *Sense*; And *spirituall Species*, (both *Visible* and *Audible*) will worke vpon the Sensories, though they moue not any other *Body*.

129 In *Delation of Sounds*, the *Enclosure* of them preserueth them, and causeth them to bee heard further. And wee finde in Roules of Parchment, or Trunkes, the Mouth being laid to the one end of the Roule of Parchment, or Trunke, and the *Eare* to the other, the *Sound* is heard much further, than in the *Open Aire*. The *Cause* is, for that the *Sound* spendeth, and is dissipated in the *Open Aire*; But in such Concaues it is conserued, and contracted. So also in a Peece of Ordnance, if you speake in the Touch-hole, and another lay his *Eare* to the Mouth of the Peece, the *Sound* passeth, and is farre better heard, than in the *Open Aire*.

130 It is further to bee considered, how it proueth, and worketh, when the *Sound* is not enclosed all the Length of his Way, but passeth partly thorow open Aire; As where you *speake* some distance from a *Trunke*; or where the *Eare* is some distance from the *Trunke*, at the other End; Or where both *Mouth* and *Eare* are distant from the *Trunke*. And

it is tried, that in a long *Trunke*, of ſome eight or ten foot, the *Sound* is holpen, though both the *Mouth;* and the *Eare* bee a handfull, or more, from the Ends of the *Trunke*; And ſomewhat more holpen, when the *Eare* of the *Hearer* is neere, than when the *Mouth* of the *Speaker*. And it is certaine, that the *Voice* is better heard in a *Chamber* from *abroad*, than *abroad* from within the *Chamber*.

131 As the *Encloſure*, that is *Round about and Entire*, preſerueth the *Sound*; So doth a *Semi-Concaue*, though in a leſſe degree. And therefore, if you diuide a *Trunke* or a *Cane* into two, and one ſpeake at the one end, and you lay your Eare at the other, it will carry the *Voice* further, than in the *Aire* at large. Nay further, if it be not a full *Semi-Concaue*; but if you doe the like vpon the *Maſt* of a *Ship*, or a *long Pole*, or a *Peece of Ordnance* (though one ſpeake vpon the Surface of the *Ordnance*, and not at any of the Bores;) the *Voice* will be heard further, than in the Aire at large.

132 It would bee tried, how, and with what proportion of diſaduantage, the *Voice* will bee carried in an *Horne*, which is a line Arched; Or in a *Trumpet*, which is a Line Retorted; Or in ſome *Pipe* that were Sinuous.

133 It is certaine, (howſoeuer it croſſe the Receiued Opinion) that *Sounds* may be created without *Aire*, though *Aire* bee the moſt fauourable *Deferent* of *Sounds*. Take a *Veſſell* of *Water*, and knap a paire of Tongs ſome depth within the Water, and you ſhall heare the *Sound* of the Tongs well, and not much diminiſhed; And yet there is no *Aire* at all preſent.

134 Take one *Veſſell of Siluer*, and another of *Wood*, and fill each of them full of Water, and then knap the Tongs together, as before, about an handfull from the Bottome, and you ſhall finde the *Sound* much more Reſounding from the *Veſſell* of *Siluer*, than from that of *Wood*: And yet if there bee no Water in the *Veſſell*, ſo that you knap the Tongs in the *Aire*, you ſhall finde no difference, betweene the *Siluer* and *Woodden Veſſell*. Whereby, beſide the maine point of creating *Sound* without *Aire*, you may collect two things: The one, that the *Sound* communicateth with the Bottome of the *Veſſell*: The other, that ſuch a Communication paſſeth farre better, thorow *Water*, than *Aire*.

135 Strike any *Hard Bodies* together, in the Middeſt of a *Flame*, and you ſhall heare the *Sound*, with little difference, from the *Sound* in the *Aire*.

136 The *Pneumaticall Part*, which is in all *Tangible Bodies*, and hath ſome Affinity with the *Aire*, performeth, in ſome degree, the Parts of the *Aire*; As when you knocke vpon an *Empty Barrell*, the *Sound* is (in part) created by the Aire on the Out-ſide; And (in part) by the *Aire* in the Inſide; For the *Sound* will bee greater or leſſer, as the Barrell is more Empty, or more full; But yet the *Sound* participateth alſo with the *Spirit* in the *Wood*, thorow which it paſſeth, from the Out-ſide to the Inſide: And ſo it commeth to paſſe, in the *Chiming* of *Bels*, on the Out-ſide; where alſo the *Sound* paſſeth to the Inſide: And a number of other

ther like Instances, whereof we shall speake more, when wee handle the *Communication* of *Sounds*.

It were extreme Grosseneſſe to thinke (as wee haue partly touched before) that the *Sound* in *Strings* is made, or produced, betweene the *Hand* and the *String*, or the *Quill* and the *String*, or the *Bow* and the *String*: For those are but *Vehicula Motus*, *Paſſages* to the *Creation* of the *Sound*; the *Sound* being produced betweene the *String* and the *Aire*; And that not by any *Impulſion* of the *Aire*, from the firſt *Motion* of the *String*; but by the *Returne* or *Reſult* of the *String*, which was ſtrained by the Touch, to his former Place: which *Motion* of *Reſult* is quicke and ſharpe; Whereas the firſt Motion, is ſoft and dull. So the *Bow* tortureth the *String* continually, and thereby holdeth it in a Continuall *Trepidation*. 137

TAke a *Trunke*, and let one whiſtle at the one End, and hold your Eare at the other, and you ſhall finde the *Sound* ſtrike ſo ſharpe, as you can ſcarce endure it. The *Cauſe* is; for that *Sound* diffuſeth it ſelfe in round; And ſo ſpendeth it ſelfe; But if the *Sound*, which would ſcatter in *Open Aire*, bee made to goe all into a Canale; It muſt needs giue greater force to the *Sound*. And ſo you may note, that *Encloſures* doe not only preſerue *Sound*, but alſo Encreaſe and Sharpen it. Experiments in Conſort touching the *Magnitude*, and *Exility*, and *Damps* of *Sounds*. 138

A *Hunters Horne*, being greater at one end, than at the other, doth increaſe the *Sound* more, than if the *Horne* were all of an equall Bore. The *Cauſe* is, for that the *Aire*, and *Sound*, being firſt contracted at the leſſer end, and afterwards hauing more Roome to ſpread at the greater end; doe dilate themſelues; And in Comming out ſtrike more *Aire*; whereby the *Sound* is the Greater, and Baſer. And euen *Hunters Hornes*, which are ſometimes made ſtreight, and not Oblique, are euer greater at the lower end. It would be tried alſo in *Pipes*, being made *far larger* at the lower end: Or being made with a *Belly* towards the lower End; And then iſſuing into a ſtreight Concaue againe. 139

There is in *Saint Iames fields*, a *Conduit* of *Bricke*, vnto which ioyneth a *low Vault*; And at the End of that, a *Round Houſe* of Stone: And in the *Bricke Conduit* there is a Window; And in the *Round Houſe* a Slit or Riſt of ſome little breadth: If you cry out in the Riſt, it will make a ſtrange full Roaring at the Window. The *Cauſe* is the ſame with the former; For that all *Concaues*, that proceed from more Narrow to more Broad, doe amplifie the *Sound* at the Comming out. 140

Hawkes Bells, that haue Holes in the Sides, giue a greater Ring, than if the Pellet did ſtrike vpon Braſſe, in the *Open Aire*. The Cauſe is the ſame with the firſt *Inſtance* of the *Trunke*; Namely, for that the *Sound* Encloſed with the Sides of the *Bell*, commeth forth at the *Holes* vnſpent; and more ſtrong. 141

In *Drummes*, the Cloſeneſſe round about, that preſerueth the *Sound* from diſperſing; maketh the *Noiſe* come forth at the *Drum-Hole*, *farre* more loud, and ſtrong, than if you ſhould ſtrike vpon the like *Skin*, ex- 142

tended in the Open Aire. The *Cause* is the same with the two precedent.

143 *Sounds* are better heard, and further off, in an *Euening*, or in the *Night*, than at the *Noone*, or in the *Day*. The *Cause* is, for that in the *Day*, when the *Aire* is more Thin, (no doubt) the *Sound* pierceth better; But when the *Aire* is more Thicke (as in the *Night*) the *Sound* spendeth and spreadeth abroad lesse: And so it is a Degree of *Enclosure*. As for the *Night*, it is true also, that the Generall Silence helpeth.

144 There bee two Kinds of *Reflexions* of *Sounds*; The one at *Distance*, which is the *Eccho*; Wherein the *Originall* is heard distinctly, and the *Reflexion* also distinctly; Of which wee shall speake hereafter: The other in *Concurrence*; When the *Sound* Reflecting (the *Reflexion* being neere at hand) returneth immediately vpon the *Originall*, and so iterateth it not, but amplifieth it. Therefore we see, that *Musicke* vpon the water soundeth more; And so likewise *Musicke* is better in Chambers Wainscotted, than Hanged.

145 The *Strings* of a Lute, or Violl, or Virginalls, doe giue a farre greater *Sound*, by reason of the *Knot*, and *Board*, and *Concaue* vnderneath, than if there were nothing but onely the *Flat* of a *Board*, without that *Hollow* and *Knot*, to let in the Vpper Aire into the Lower. The *Cause* is, the Communication of the Vpper Aire with the Lower; And penning of both from Expence, or dispersing.

146 An *Irish Harpe* hath Open Aire on both sides of the *Strings*: And it hath the *Concaue* or *Belly*, not along the *Strings*, but at the End of the *Strings*. It maketh a more Resounding *Sound*, than a *Bandora*, *Orpharion*, or *Citterne*, which haue likewise *Wire-strings*. I iudge the *Cause* to bee, for that Open Aire on both Sides helpeth, so that there be a *Concaue*, Which is therefore best placed at the End.

147 In a *Virginall*, when the *Lid* is downe, it maketh a more exile *Sound*, than when the *Lid* is open. The *Cause* is, for that all *Shutting in* of *Aire*, where there is no competent Vent, dampeth the *Sound*. Which maintaineth likewise the former *Instance*; For the *Belly* of the *Lute*, or *Violl*, doth pen the *Aire* somewhat.

148 There is a *Church* at *Gloucester* (and as I haue heard, the like is in some other places;) where if you speake against a Wall, softly, another shall heare your *Voice* better a good Way off, than neere hand. Enquire more particularly of the Frame of that place. I suppose there is some Vault, or Hollow, or Isle, behind the Wall, and some Passage to it towards the further end of that Wall, against which you speake; So as the *Voice* of him that speaketh, slideth along the Wall, and then entreth at some Passage, and communicateth with the *Aire* of the Hollow; for it is preserued somewhat by the plaine Wall; but that is too weake to giue a *Sound* Audible, till it hath communicated with the backe *Aire*.

149 Strike vpon a *Bow-string*, and lay the *Horne* of the *Bow* neere your Eare, and it will encrease the *Sound*, and make a degree of a *Tone*. The *Cause* is, for that the Sensory, by reason of the Close Holding, is percussed,

cuſſed, before the Aire diſperſeth. The like is, if you hold the *Horne* betwixt your Teeth. But that is a plaine *Delation* of the *Sound*; from the Teeth, to the Inſtrument of Hearing; For there is a great Entercourſe betweene thoſe two Parts; As appeareth by this; That a Harſh *Grating Tune* ſetteth the Teeth on edge. The like falleth out, if the *Horne* of the *Bow* be put vpon the Temples; But that is but the Slide of the *Sound* from thence to the Eare.

If you take a *Rod* of *Iron*, or *Braſſe*, and hold the one end to your Eare, 150
and ſtrike vpon the other, it maketh a far greater *Sound*, than the like Stroke vpon the *Rod*, not ſo made Contiguous to the Eare. By which, and by ſome other *Inſtances*, that haue beene partly touched, it ſhould appeare; That *Sounds* doe not onely ſlide vpon the Surface of a Smooth Body, but doe alſo communicate with the Spirits, that are in the Pores of the Body.

I remember in *Trinity College* in *Cambridge*, there was an *Vpper* 151
Chamber, which being thought weake in the Roofe of it, was ſupported by a Pillar of Iron, of the bigneſſe of ones Arme, in the middeſt of the *Chamber*; Which if you had ſtrucke, it would make a little flat Noiſe in the *Roome* where it was ſtrucke; But it would make a great Bombe in the *Chamber* beneath.

The *Sound* which is made by *Buckets* in a *well*, when they touch vp- 152
on the *Water*; Or when they ſtrike vpon the ſide of the *well*; Or when two Buckets daſh the one againſt the other; Theſe *Sounds* are deeper and fuller, than if the like Percuſſion were made in the *Open Aire*. The *Cauſe* is, the Penning and Encloſure of the Aire, in the Concaue of the *well*.

Barrels placed in a Roome vnder the Floare of a *Chamber*, make all 153
Noiſes in the ſame Chamber, more Full and Reſounding.

So that there be fiue wayes (in generall) of Maioration of Sounds: Encloſure Simple; Encloſure with Dilatation; Communication; Reflexion Concurrent; *and* Approach *to the* Senſory.

For *Exility* of the *Voice*, or other *Sounds*: It is certaine, that the 154
Voice doth paſſe thorow *Solid* and *Hard Bodies*, if they be not too thick. And thorow *Water*, which is likewiſe a very Cloſe Body, and ſuch an one, as letteth not in Aire. But then the *Voice*, or other *Sound*, is reduced, by ſuch paſſage, to a great *Weakneſſe*, or *Exilitie*. If therefore you ſtop the *Holes* of a *Hawkes Bell*, it will make no Ring, but a flat Noiſe, or Rattle. And ſo doth the *Aëtites*, or *Eagles* Stone, which hath a little Stone within it.

And as for *Water*, it is a certaine Triall: Let a Man goe into a *Bath*, 155
and take a *Paile*, and turne the Bottome vpward, and carry the Mouth of it, (Euen,) downe to the Leuell of the *Water*, and ſo preſſe it downe vnder the *Water*, ſome handful and an halfe, ſtill keeping it euen, that it may not tilt on either ſide, & ſo the Aire get out: then let him that is in the *Bath*, diue with his Head ſo far vnder *Water*, as he may put his head into the *Paile*; & there wil come as much *Aire* bubling forth, as wil make

Roome for his Head. Then let him ſpeak; & any that ſhall ſtand without, ſhall heare his *Voice* plainly; but yet made extreme ſharp and exile, like the *Voice* of *Puppets*: But yet the *Articulate Sounds* of the *words* will not be confounded. Note that it may be much more handſomly done, if the *Paile* be put ouer the Mans head aboue water, and then he cowre downe, and the *Paile* be preſſed downe with him. Note that a man muſt kneele or ſit, that he may be lower than the *Water*. A man would think, that the *Sicilian Poet* had knowledge of this *Experiment*; For he ſaith; That *Hercules Page Hylus* went with a Waterpot, to fill it at a pleaſant *Fountaine*, that was neere the Shore, and that the *Nymphs* of the *Fountaine* fell in loue with the Boy, & pulled him vnder *water*, keeping him aliue; And that *Hercules* miſſing his *Page*, called him by his Name, aloud, that all the ſhore rang of it; and that *Hylas* from within the Water, anſwered his Maſter; But (that which is to the preſent purpoſe) with ſo ſmall and exile a *Voice*, as *Hercules* thought he had beene three miles off, when the *Fountaine* (indeed) was faſt by.

156 In *Lutes* and *Inſtruments* of *Strings*, if you ſtop a *String* high (whereby it hath leſſe ſcope to tremble) the *Sound* is more *Treble*, but yet more dead.

157 Take two *Sawcers*, and ſtrike the edge of the one againſt the bottom of the other, within a *Paile* of *water*; And you ſhall finde, that as you put the Sawcers lower and lower, the Sound groweth more flat; euen while Part of the *Sawcer* is aboue the Water; But that Flatneſſe of *Sound* is ioyned with a Harſhneſſe of *Sound*; which (no doubt) is cauſed by the inequality of the *Sound*, which commeth from the part of the *Sawcer* vnder the *water*, and from the Part aboue. But when the *Sawcer* is wholly vnder the *Water*, the *Sound* becommeth more cleare, but farre more low; And as if the *Sound* came from a farre off.

158 A *Soft Body* dampeth the *Sound*, much more than a *Hard*; As if a Bell hath Cloth, or Silk wrapped about it, it deadeth the *Sound* more, than if it were Wood. And therefore in *Clericals*, the Keyes are lined; And in Colleges they vſe to line the Tablemen.

159 Triall was made in a *Recorder*, after theſe ſeuerall manners. The Bottome of it was ſet againſt the Palme of the Hand; ſtopped with Wax round about; ſet againſt a Damaske Cuſhion; Thruſt into Sand; Into Aſhes; Into Water (halfe an inch vnder the Water;) Cloſe to the Bottome of a Siluer Baſin; And ſtill the *Tone* remained: but the Bottome of it was ſet againſt a Woollen Carpet; A Lining of Pluſh; A Lock of Wooll, (though looſely put in;) Againſt Snow; And the Sound of it was quite deaded, and but Breath.

160 *Iron* Hot, produceth not ſo full a *Sound*, as when it is Cold; For while it is hot, it appeareth to be more ſoft, and leſſe reſounding. So likewiſe *warme water*, when it falleth, maketh not ſo full a *Sound*, as *Cold*: And I conceiue it is ſofter, and neerer the Nature of Oile; For it is more ſlippery; As may be perceiued, in that it ſcowreth better.

161 Let there be a *Recorder* made, with two *Fipples*, at each end one; The

Trunke

Trunke of it of the length of two *Recorders*, and the Holes answerable toward each end; And let two play the same lesson vpon it, at an Vnison: And let it be noted, whether the *Sound* be confounded, or amplified; or dulled. So likewise let a *Crosse* bee made, of two Truncke (thorow-out) hollow; And let two speake, or sing, the one long-waies, the other trauerse: And let two heare at the opposite Ends; And note, whether the *Sound* be confounded; amplified; or dulled. Which two *Instances* will also giue light to the *Mixture* of *Sounds*, whereof we shall speake hereafter.

A *Bellowes* blowne in at the *Hole* of a *Drumme*, and the *Drum* then strucken, maketh the *Sound* a little flatter, but no other apparent Alteration. The *Cause* is manifest; Partly for that it hindereth the Issue of the *Sound*; And partly for that it maketh the *Aire*, being blowne together, lesse moueable. 162

THe *Loudnesse* and *Softnesse* of *Sounds*, is a Thing distinct from the *Magnitude* and *Exilitie* of *Sounds*; For a *Base String*, though softly strucken, giueth the greater *Sound*; But a *Treble String*, if hard strucken, will be heard much further off. And the *Cause* is, for that the *Base String* striketh more *Aire*; And the *Treble* lesse *Aire*, but with a sharper percussion. Experiments in Consort touching the *Loudnesse* or *Softnesse* of *Sounds*; and their *Carriage at longer & shorter Distance*. 163

It is therfore the *Strength* of the *Percussion*, that is a Principall *Cause* of the *Loudnesse* or *Softnesse* of *Sounds*: As in knocking harder or softer; Winding of a Horne stronger or weaker; Ringing of a Hand-bell harder or softer, &c. And the *strength* of this *percussion* consisteth as much, or more, in the *Hardnesse* of the *Body percussed*, as in the *Force* of the *Body percussing*: For if you strike against a Cloth, it will giue a lesse *Sound*; If against Wood, a greater; If against Metall, yet a greater; And in Metals, if you strike against Gold, (which is the more pliant,) it giueth the flatter *Sound*; If against Siluer, or Brasse, the more Ringing *Sound*. As for *Aire*, where it is strongly pent, it matcheth a *Hard Bodie*. And therfore we see in discharging of a *Peece*, what a great *Noise* it maketh. We see also, that the Charge with Bullet; Or with paper wet, and hard stopped; Or with powder alone, rammed in hard; maketh no great difference in the *Loudnesse* of the Report. 164

The *Sharpnesse* or *Quicknesse* of the *Percussion*, is a great *Cause* of the *Loudnesse*, as well as the *strength*: As in a Whip, or Wand, if you strike the *Aire* with it; the sharper and quicker you strike it, the *louder Sound* it giueth. And in playing vpon the *Lute*, or *Virginals*, the quicke stroke or Touch, is a great life to the *Sound*. The *Cause* is, for that the Quicke Striking cutteth the *Aire* speedily; whereas the Soft Striking doth rather beat than cut. 165

The *Communication* of *Sounds* (as in Bellies of *Lutes*, Emptie Vessels, *&c.*) hath beene touched obiter, in the *Maioration* of *Sounds*: But it is fit also to make a *Title* of it apart. Experiments in *Consort* touching the *Communication* of *Sounds*.

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166 The *Experiment* for greateſt Demonſtration of *Communication* of *Sounds*, is the *Chiming* of *Bells*; Where if you ſtrike with a Hammer vpon the Vpper Part, and then vpon the Midſt, and then vpon the Lower, you ſhall finde the *Sound* to bee more Treble, and more Baſe, according vnto the Concaue, on the Inſide; though the Percuſſion bee onely on the Out-ſide.

167 When the *Sound* is created betweene the *Blaſt* of the *Mouth*, and the *Aire* of the *Pipe*, it hath neuertheleſſe ſome *Communication* with the Matter of the Sides of the *Pipe*, and the Spirits in them contained; for in a *Pipe* or *Trumpet*, of Wood, and Braſſe, the *Sound* will bee diuers; So if the *Pipe* be couered with *Cloth*, or *Silke*, it will giue a diuers *Sound*, from that it would doe of it ſelfe; So, if the *Pipe* bee a *little wet* on the Inſide, it will make a differing *Sound*, from the ſame *Pipe dry*.

168 That *Sound* made within *Water*, doth communicate better with a hard Body thorow *Water*, than made in *Aire*, it doth with *Aire*; *Vide Experimentum* 134.

Experiments in Conſort, touching *Equality*, and *Inequality* of *Sounds*.

Wee haue ſpoken before (in the *Inquiſition* touching *Muſicke*,) of *Muſicall Sounds*, whereunto there may be a Concord or Diſcord in two Parts; Which Sounds we call Tones: And likewiſe of *Immuſicall Sounds*; And haue giuen the *Cauſe*, that the *Tone* proceedeth of *Equality*, and the other of *Inequality*. And wee haue alſo expreſſed there, what are the *Equall Bodies* that giue *Tones*, and what are the *Vnequall* that giue none. But now wee ſhall ſpeake of ſuch *Inequality* of *Sounds*, as proceedeth, not from the Nature of the Bodies themſelues, but is Accidentall; Either from the *Roughneſſe*, or *Obliquitie* of the *Paſſage*; Or from the *Doubling* of the *Percutient*; Or from the *Trepidation* of the *Motion*.

169 A *Bell*, if it haue a *Riſt* in it, whereby the *Sound* hath not a cleare Paſſage, giueth a *Hoarſe* and *Iarring Sound*; So the *Voice* of *Man*, when by cold taken the Weſill groweth rugged, and (as we call it) furred, becommeth hoarſe. And in theſe two *Inſtances*, the *Sounds* are Ingrate; becauſe they are meerly vnequall: But, if they bee *Vnequall* in *Equality*, then the *Sound* is Gratefull, but Purling.

170 All *Inſtruments*, that haue either *Returnes*, as Trumpets; Or *Flexions*, as Cornets; Or are *Drawne vp*, and *put from*, as Sackbuts; haue a *Purling Sound*: But the *Recorder* or *Flute*, that haue none of theſe *Inequalities*, giue a cleare *Sound*. Neuertheleſſe, the *Recorder* it ſelfe, or *Pipe* moiſtened a little in the Inſide, ſoundeth more ſolemnly, and with a little Purling, or Hiſſing. Againe, a *Wreathed String*, ſuch as are in the Baſe Strings of *Bandores*, giueth alſo a *Purling Sound*.

171 But a *Lute-ſtring*, if it be meerely *Vnequall* in his Parts, giueth a Harſh and

and vntuneable *Sound*; which *Strings* wee call *False*, being bigger in one Place than in another; And therefore *Wire-strings* are neuer *False*. We see also, that when wee try a *False Lute-string*, wee vse to extend it hard betweene the fingers, and to fillip it; And if it giueth a double *Species*, it is *True*; But if it giueth a Treble, or more, it is *False*.

Waters, in the *Noise* they make as they run, represent to the Eare a *Trembling Noise*; And in *Regalls*, (where they haue a *Pipe*, they call the *Nightingale-Pipe*, which containeth *Water*) the *Sound* hath a continuall Trembling: And Children haue also little Things they call *Cocks*, which haue *Water* in them; And when they blow, or whistle in them, they yeeld a *Trembling Noise*; Which *Trembling* of *Water*, hath an affinity with the Letter *L*. All which *Inequalities* of *Trepidation*, are rather pleasant, than otherwise. 172

All *Base Notes*, or very *Treble Notes*, giue an Asper *Sound*; For that the *Base* striketh more *Aire*, than it can well strike equally: And the *Treble* cutteth the *Aire* so sharpe, as it returneth too swift, to make the *Sound* Equall: And therefore a *Meane* or *Tenor*, is the sweetest Part. 173

We know nothing, that can at pleasure make a *Musicall* or *Immusicall Sound*, by voluntary *Motion*, but the *Voice* of *Man*, and *Birds*. The *Cause* is (no doubt) in the Weasill or Wind-pipe, (which wee call *Aspera Arteria*,) which being well extended, gathereth *Equality*; As a Bladder that is wrinckled; if it bee extended, becommeth smooth. The Extension is alwayes more in *Tones*, than in *Speech*: Therefore the *Inward Voice* or *Whisper* can neuer giue a *Tone*: And in *Singing*, there is (manifestly) a greater Working and Labour of the Throat, than in *Speaking*; As appeareth in the Thrusting out, or Drawing in of the Chin, when we sing. 174

The *Humming* of *Bees*, is an *Vnequall Buzzing*; And is conceiued, by some of the Ancients, not to come forth at their Mouth, but to bee an *Inward Sound*; But (it may bee) it is neither; But from the motion of their Wings; For it is not heard but when they stirre. 175

All *Metalls quenched* in *Water*, giue a Sibilation or Hissing Sound; (which hath an Affinity with the letter *Z*.) notwithstanding the *Sound* be created betweene the *Water* or *Vapour*, and the *Aire*. *Seething* also, if there be but small store of *Water* in a Vessell, giueth a Hissing *Sound*; But *Boyling* in a full Vessell, giueth a Bubling *Sound*, drawing somewhat neere to the *Cockes* vsed by Children. 176

Triall would be made, whether the *Inequality*, or Interchange of the *Medium*, will not produce an *Inequality* of *Sound*; As if three *Bells* were made one within another, and *Aire* betwixt Each; and then the outermost *Bell* were Chimed with a Hammer, how the *Sound* would differ from a Simple *Bell*. So likewise take a *Plate* of *Brasse*, and a planke of *Wood*, and ioyne them close together, and knocke vpon one of them, and see if they doe not giue an *Vnequall Sound*. So make two or three *Partitions* of *Wood* in a *Hogshead*, with *Holes* or *Knots* in them; And marke the difference of their *Sound*, from the *Sound* of an *Hogshead* without such *partitions*. 177

It

Experiments in Consort, touching the more Treble, and the more Base Tones, or Musicall Sounds.

178 IT is euident, that the *Percussion* of the *Greater quantity of Aire*, causeth the *Baser Sound*; And the lesse *Quantity*, the more *Treble Sound*. The *Percussion* of the *Greater Quantity of Aire*, is produced by the *Greatnesse of the Body Percussing*; By the *Latitude* of the *Concaue*, by which the *Sound* passeth; and by the *Longitude* of the same *Concaue*. Therefore we see that a *Base string*, is greater than a *Treble*; A *Base Pipe* hath a greater Bore than a *Treble*; And in *Pipes*, and the like, the lower the Note Holes be, and the further off from the Mouth of the *Pipe*, the more *Base Sound* they yeeld; And the neerer the Mouth, the more *Treble*. Nay more, if you strike an *Entire Body*, as an *Andiron* of *Brasse*, at the Top, it maketh a more *Treble Sound*; And at the Bottome a *Baser*.

179 It is also euident, that the *Sharper* or *Quicker Percussion of Aire* causeth the more *Treble Sound*; And the *Slower* or *Heauier*, the more *Base Sound*. So we see in *Strings*; the more they are wound vp, and strained; (And thereby giue a more quicke start backe;) the more *Treble* is the *Sound*; And the slacker they are, or lesse wound vp, the *Baser* is the *Sound*. And therefore a Bigger *String* more strained, and a lesser *String*, lesse strained, may fall into the same *Tone*.

180 *Children*, *Women*, *Eunuchs* haue more small and shrill *Voices* than *Men*. The Reason is, not for that *Men* haue greater Heat, which may make the *Voice* stronger, (for the strength of a *Voice* or *Sound*, doth make a difference in the *Loudnesse* or *Softnesse*, but not in the *Tone*;) But from the Dilatation of the Organ; which (it is true) is likewise caused by Heat. But the Cause of *Changing* the *Voice*, at the yeares of Puberty, is more obscure. It seemeth to be, for that when much of the Moisture of the Body which did before irrigate the Parts, is drawne downe to the Spermaticall vessels; it leaueth the Body more hot than it was; whence commeth the Dilatation of the Pipes: For we see plainly, all Effects of Heat, doe then come on; As Pilosity, more Roughnesse of the Skin, Hardnesse of the Flesh, &c.

181 The Industry of the *Musitian*, hath produced two other Meanes of *Straining*, or *Intension* of *Strings*, besides their *Winding vp*. The one is the *Stopping* of the *String* with the *Finger*; As in the Neckes of Lutes, Viols, &c. The other is the *Shortnesse* of the *String*; As in Harps, Virginalls, &c. Both these haue one, and the same reason; for they cause the *String* to giue a quicker start.

182 In the *straining* of a *String*, the further it is strained, the lesse *Superstraining* goeth to a *Note*; For it requireth good Winding of a String, before it will make any Note at all: And in the Stops of Lutes, &c. the higher they goe, the lesse Distance is betweene the Frets.

183 If you fill a *Drinking Glasse* with *Water*, (especially one sharpe below, and Wide aboue,) and fillip vpon the Brim, or Out-side; And after empty Part of the *water*, and so more and more, and still try the *Tone* by Fillipping; you shall find the *Tone* fall, and bee more *Base*, as the *Glasse* is more Empty.

The

Experiments in Consort, touching the *Proportion* of *Treble* and *Base Tones*.

The Iust and Measured *Proportion* of the *Aire Percussed*, towards the *Baseneſſe* or *Trebleneſſe* of *Tones*, is one of the greatest Secrets in the Contemplation of *Sounds*. For it discouereth the true *Coincidence* of *Tones* into *Diapasons*; Which is the Returne of the same *Sound*. And so of the *Concords* and *Discords*; betweene the *Vniſon*, and *Diapaſon*; Which we haue touched before, in the *Experiments* of *Muſicke*; but thinke fit to resume it here, as a principall Part of our Enquiry touching the *Nature* of *Sounds*. It may bee found out in the *Proportion* of the *Winding* of *Strings*: In the *Proportion* of the *Diſtance* of *Frets*; And in the *Proportion* of the *Concaue* of *Pipes*, &c. But most commodiously in the last of these.

184 Try therefore the *Winding* of a *String* once about, as soone as it is brought to that Extension, as will giue a *Tone*; And then of twice about; And thrice about, &c. And marke the Scale or Difference of the Rise of the *Tone*: Whereby you shall discouer, in one, two Effects; Both the *Proportion* of the *Sound* towards the *Dimenſion* of the *Winding*; And the *Proportion* likewise of the *Sound* towards the *String*, as it is more or lesse strained. But note that to measure this, the way will bee, to take the Length in a right Line of the *String*, vpon any Winding about of the Peg.

185 As for the *Stops*, you are to take the *Number* of *Frets*; And principally the *Length* of the *Line*, from the first Stop of the *String*, vnto such a Stop as shall produce a *Diapaſon* to the former Stop, vpon the same *String*.

186 But it will best (as it is said) appeare, in the *Bores* of *Wind-Inſtruments*: And therefore cause some halfe dozen *Pipes*, to be made, in length, and all things else, alike, with a single, double, and so on to a sextuple *Bore*; And so marke what Fall of *Tone* euery one giueth. But still in these three last *Inſtances*, you must diligently obserue, what *Length of String*, or *Diſtance* of *Stop*, or *Concaue* of *Aire*, maketh what *Riſe* of *Sound*. As in the last of these (which (as wee said) is that, which giueth the aptest demonstration,) you must set downe what Encrease of *Concaue* goeth to the Making of a *Note* higher; And what of two *Notes*; And what of three *Notes*; And so vp to the *Diapaſon*: For then the great Secret of *Numbers*, and *Proportions*, will appeare. It is not vnlike, that those that make *Recorders*, &c. know this already: for that they make them in *Sets*. And likewise *Bell-Founders* in fitting the Tune of their *Bels*. So that Enquiry may saue Triall. Surely, it hath beene obserued by one of the *Ancients*, that an *Empty Barrell* knocked vpon with the finger, giueth a *Diapaſon* to the *Sound* of the like *Barrell full*; But how that should bee, I doe not well vnderstand; For that the knocking of a *Barrell full*, or *Empty*, doth scarce giue any *Tone*.

There

187 There is required some sensible Difference in the *Proportion* of creating a *Note*, towards the *Sound* it selfe, which is the Passiue: And that it bee not too neare, but at a distance. For in a *Recorder*, the three vppermost Holes, yeeld one *Tone*; which is a *Note* lower than the *Tone* of the first three. And the like (no doubt) is required in the Winding or Stopping of *Strings*.

Experiments in Consort touching *Exteriour*, and *Interiour Sounds*.

There is another Difference of *Sounds*, which wee will call *Exteriour*, and *Interiour*. It is not *Soft*, nor *Loud*: Nor it is not *Base*, nor *Treble*: Nor it is not *Musicall*, nor *Immusicall*: Though it bee true, that there can bee no *Tone* in an *Interiour Sound*: But on the other side, in an *Exteriour Sound*, there may bee both *Musicall* and *Immusicall*. Wee shall therefore enumerate them, rather than precisely distinguish them; Though (to make some Adumbration of that wee meane) the *Interiour* is rather an *Impulsion* or *Contusion* of the *Aire*, than an *Elision* or *Section* of the same. So as the *Percussion* of the one, towards the other, differeth, as a *Blow* differeth from a *Cut*.

188 In *Speech* of *Man*, the *Whispering*, (which they call *Susurrus* in *Latine*,) whether it be louder or softer, is an *Interiour Sound*; But the *Speaking out*, is an *Exteriour Sound*; And therefore you can neuer make a *Tone*, nor sing in *Whispering*; But in *Speech* you may: So *Breathing*, or *Blowing* by the *Mouth*, *Bellowes*, or *Wind*, (though loud) is an *Interiour Sound*; But the *Blowing* thorow a *Pipe*, or *Concaue*, (though soft) is an *Exteriour*. So likewise, the greatest *Windes*, if they haue no Coarctation, or blow not hollow, giue an *Interiour Sound*; The Whistling or hollow *Winde* yeeldeth a Singing, or *Exteriour Sound*; The former being pent by some other Body; The latter being pent in by his owne Density: And therefore wee see, that when the *Winde* bloweth hollow, it is a Signe of Raine. The *Flame*, as it moueth within it selfe, or is blowne by a *Bellowes*, giueth a Murmur or *Interiour Sound*.

189 There is no *Hard Body*, but strucke against another *Hard Body*, will yeeld an *Exteriour Sound*, greater or lesser: Insomuch as if the Percussion bee ouer-soft, it may induce a Nullity of *Sound*; But neuer an *Interiour Sound*; As when one treadeth so softly, that he is not heard.

190 Where the *Aire* is the *Percutient*, pent, or not pent, against a *Hard Body*, it neuer giueth an *Exteriour Sound*; As if you blow strongly with a Bellowes against a Wall.

191 *Sounds* (both *Exteriour* and *Interiour*,) may bee made as well by *Suction*, as by *Emission* of the *Breath*: As in *Whistling*, or *Breathing*.

Experiments in *Consort* touching *Articulation of Sounds*.

192 It is euident, and it is one of the strangest Secrets in *Sounds*, that the *whole Sound* is not in the whole *Aire* onely; But the *whole Sound* is also in euery small *Part* of the *Aire*. So that all the curious Diuersity of *Articulate*

culate Sounds, of the Voice of Man, or Birds, will enter at a ſmall Cranny, Inconfuſed.

The *Vnequall Agitation* of the *Winds*, and the like, though they bee materiall to the Carriage of the *Sounds*, further, or leſſe way; yet they doe not confound the *Articulation* of them at all, within that diſtance that they can be heard; Though it may be, they make them to be heard leſſe Way, than in a Still, as hath beene partly touched. 193

Ouer-great Diſtance confoundeth the *Articulation* of *Sounds*; As we ſee, that you may heare the *Sound* of a Preachers voice, or the like, when you cannot diſtinguiſh what he ſaith. And one *Articulate Sound*, will confound another; As when many ſpeake at once. 194

In the *Experiment* of *Speaking vnder Water*, when the Voice is reduced to ſuch an Extreme Exility, yet the *Articulate Sounds*, (which are the *Words*,) are not confounded; as hath beene ſaid. 195

I conceiue, that an *Extreme Small*, or an *Extreme Great Sound*, cannot be *Articulate*; But that the *Articulation* requireth a *Mediocrity* of *Sound*: For that the *Extreme Small Sound* confoundeth the *Articulation* by *Contracting*; And the *Great Sound*, by *Diſperſing*: And although (as was formerly ſaid) a *Sound Articulate*, already created, will be contracted into a ſmall Cranny; yet the firſt *Articulation* requireth more Dimenſion. 196

It hath beene obſerued, that in a *Roome*, or in a *Chappell*, Vaulted below, and Vaulted likewiſe in the Roofe, a Preacher cannot be heard ſo well, as in the like Places not ſo Vaulted. The Cauſe is, for that the *Subſequent Words* come on, before the *Precedent Words* vaniſh: And therefore the *Articulate Sounds* are more confuſed, though the Groſſe of the *Sound* be greater. 197

The *Motions* of the *Tongue*, *Lips*, *Throat*, *Pallat*, &c. which goe to the *Making* of the ſeuerall *Alphabeticall Letters*, are worthy Enquiry, and pertinent to the preſent *Inquiſition* of *Sounds*: But becauſe they are ſubtill, and long to deſcribe, we will refer them ouer, and place them amongſt the *Experiments of Speech*. The *Hebrewes* haue beene diligent in it, and haue aſſigned, which *Letters* are *Labiall*, which *Dentall*, which *Gutturall*, &c. As for the *Latines*, and *Grecians*, they haue diſtinguiſhed betweene *Semi-vowels*, and *Mutes*; And in *Mutes*, betweene *Mutæ Tenues*, *Mediæ*, and *Aſpiratæ*; Not amiſſe; But yet not diligently enough. For the ſpeciall *Strokes*, and *Motions*, that create thoſe *Sounds*, they haue little enquired: As that the *Letters*, *B.P.F.M.* are not expreſſed, but with the *Contracting*, or *Shutting* of the *Mouth*; That the *Letters N.* and *B.* cannot be pronounced, but that the *Letter N.* will turne into *M.* As *Hecatonba*, will be *Hecatomba*. That *M.* and *T.* cannot be pronounced together, but *P.* will come betweene; as *Emtus*, is pronounced *Emptus*; And a Number of the like. So that if you enquire to the full; you will finde, that to the Making of the whole *Alphabet*, there will be fewer *Simple Motions* required, than there are *Letters*. 198

The *Lungs* are the moſt Spongy Part of the Body; And therefore ableſt to contract, and dilate it ſelfe; And where it contracteth it ſelfe, 199

it expelleth the *Aire*; which thorow the *Artire*, *Throat*, and *Mouth*, maketh the *Voice*: But yet *Articulation* is not made, but with the helpe of the *Tongue*, *Pallat*, and the reſt of thoſe they call *Inſtruments* of *voice*.

200 There is found a Similitude, betweene the *Sound* that is made by *Inanimate Bodies*, or by *Animate Bodies*, that haue no *Voice Articulate*; and diuers *Letters* of *Articulate Voices*: And commonly Men haue giuen ſuch Names to thoſe *Sounds*, as doe allude vnto the Articulate Letters. As *Trembling* of *Water* hath Reſemblance with the *Letter* L; *Quenching* of *Hot Metals*, with the *Letter* Z; *Snarling* of *Dogs*, with the *Letter* R; The *Noiſe of Scritchowles*, with the *Letter* Sh; *Voice* of *Cats*, with the *Dypthong* Eu; *Voice* of *Cuckoes*, with the *Dypthong* Ou; *Sounds*, of *Strings*, with the *Letter* Ng: So that if a Man, (for Curioſity, or Strangeneſſe ſake) would make a *Puppet*, or other Dead Body, to pronounce a *Word*; Let him conſider, on the one Part, the Motion of the *Inſtruments* of *Voice*; and on the other part the like *Sounds* made in *Inanimate Bodies*; And what Conformity there is that cauſeth the Similitude of *Sounds*; And by that hee may miniſter light to that Effect.

(***)

NATV-

NATVRALL HISTORIE.

III. Century.

ALL *Sounds* (whatsoeuer) moue Round; That is to say; On *all Sides*; *Vpwards*; *Downwards*; *Forwards*; and *Backewards*. This appeareth in all *Instances*.

201 Experiments in Consort touching the *Motions* of *Sounds*, in what *Lines* they are *Circular*, *Oblique*, *Straight*; *Vpwards*, *downwards*; *Forwards*, *Backwards*.

Sounds doe not require to be conueyed to the *Sense*, in a *Right Line*, as *Visibles* doe, but maybee *Arched*; Though it be true, they moue strongest in a *Right line*, which neuertheless is not caused by the *Rightnesse* of the *Line*, but by the Shortnesse of the distance; *Linea recta brevissima*. And therefore wee see, if a *Wall* bee betweene, and you speake on the one Side, you heare it on the other; Which is not because the *Sound* passeth thorow the *Wall*; but *Archeth* ouer the *Wall*.

202

If the *Sound* bee *Stopped* and *Repercussed*, it commeth about on the other Side, in an *Oblique Line*. So, if in a *Coach*, one Side of the Boot be downe, and the other vp; And a Beggar beg on the Close Side; you would thinke that he were on the Open Side. So likewise, if a or *Bell Clocke*, be (for Example) on the North-side of a Chamber; And the Window of that Chamber be vpon the South; Hee that is in the Chamber will thinke the *Sound* came from the South.

203

Sounds though they *spread round*, (so that there is an *Orbe* or *Sphericall Area* of the *Sound*;) yet they moue strongest, and goe furthest in the *Fore-lines*, from the first Locall Impulsion of the Aire. And therefore in *Preaching*, you shall heare the *Preachers* Voice, better before the Pulpit than behinde it, or on the Sides, though it stand open. So a *Harquebuz*, or *Ordnance*, will be further heard, forwards, from the Mouth of the *Peece*, than backwards, or on the Sides.

204

It may bee doubted, that *Sounds* doe moue better Downwards

205

than Vpwards. *Pulpits* are placed high aboue the People. And when the Ancient *Generalls* ſpake to their Armies, they had euer a Mount of Turfe caſt vp, whereupon they ſtood: But this may bee imputed to the Stops and Obſtacles, which the voice meeteth with, when one ſpeaketh vpon the leuell. But there ſeemeth to bee more in it: For it may bee, that *Spirituall Species*, both of *Things Viſible* and *Sounds*, doe moue better *Downewards* than *Vpwards*. It is a ſtrange Thing, that to Men ſtanding below on the Ground, thoſe that bee on the Top of Pauls, ſeeme much leſſe than they are, and cannot bee knowne; But to Men aboue, thoſe below ſeeme nothing ſo much leſſened, and may be knowne, yet it is true, that all things to them aboue, ſeeme alſo ſomewhat contracted, and Better collected into Figure: As *Knots* in *Gardens* ſhew beſt from an Vpper-window, or Tarras.

206 But to make an exact Triall of it, let a Man ſtand in a *Chamber*, not much aboue the Ground, and ſpeake out at the window, thorow a *Trunke*, to one ſtanding on the ground, as ſoftly as hee can, the other laying his Eare cloſe to the *Trunke*: Then *viâ verſa*, let the other ſpeake *below* keeping the ſame Proportion of Softneſſe; And let him in the *Chamber* lay his Eare to the *Trunke*: And this may bee the apteſt Meanes, to make a Iudgement, whether *Sounds* deſcend, or aſcend, better.

Experiments in Conſort, touching the *Laſting & Periſhing of Sounds*; And touching the *Time* they require to their *Generation*, or *Delation*.

AFter that *Sound* is created (which is in a moment) wee finde it continueth ſome ſmall time, melting by little and little. In this there is a wonderfull Errour amongſt Men, who take this to bee a *Continuance* of the Firſt *Sound*: whereas (in truth) it is a *Renouation*, and not a *Continuance*: For the *Body percuſſed*, hath by reaſon of the *Percuſſion*, a *Trepidation* wrought in the *Minute Parts*; and ſo reneweth the *Percuſſion* of the *Aire*. This appeareth manifeſtly, becauſe that the Melting *Sound* of a Bell, or of a String ſtrucken, which is thought to be a *Continuance*, ceaſeth as ſoon as the Bell or String are touched. As in a Virginall, as ſoone as euer the Iacke falleth; and toucheth the String, the Sound ceaſeth; And in a Bell after you haue chimed vpon it, if you touch the Bell, the *Sound* ceaſeth. And in this you muſt diſtinguiſh, that there are two *Trepidations*: The one Manifeſt and Locall; As of the Bell, when it is penſile: The other Secret, of the Minute Parts; ſuch as is deſcribed in the ninth Inſtance. But it is true, that the *Locall* helpeth the *Secret* greatly. Wee ſee likewiſe that in Pipes, and other wind-Inſtruments, the *Sound* laſteth no longer, than the breath bloweth. It is true, that in Organs, there is a confuſed Murmur for a while, after you haue plaied; But that is but while the Bellowes are in Falling.

207

208 It is certaine, that in the *Noiſe* of great *Ordnance*, where many are ſhot off together, the *Sound* will bee carried, (at the leaſt) twenty Miles vpon the Land; and much further vpon the Water. But then it will come to the Eare; Not in the Inſtant of the Shooting off, but it will come an Houre, or more later. This muſt needs bee a *Continuance* of the *Firſt Sound*; For there is no *Trepidation* which ſhould renew it. And

the

the Touching of the *Ordnance* would not extinguish the *Sound* the sooner: So that in great *Sounds* the *Continuance* is more than Momentany.

209 To try exactly the time wherein *Sound* is *Delated*, Let a Man stand in a Steeple, and haue with him a Taper; And let some Vaile bee put before the Taper; And let another man stand in the Field a Mile off. Then let him in the Steeple strike the Bell; And in the same Instant with-draw the Vaile; And so let him in the Field tell by his Pulse what distance of *Time* there is, betweene the *Light seene*, and the *Sound Heard*: For it is certaine that the *Delation* of Light is in an Instant. This may bee tried in farre greater Distances, allowing greater *Lights* and *Soupds*.

210 It is generally knowne and obserued, that *Light* and the *Obiect* of *Sight*, move swifter than *Sound*; For wee see the *Flash* of a Peece is seene sooner than the *Noise* is heard. And in hewing wood, if one be some distance off, he shall see the Arme lifted vp for a second Stroke, before hee heare the Noise of the first. And the greater the Distance, the greater is the Preuention: As wee see in Thunder which is farre off, where the Lightning Precedeth the Cracke a good space.

211 *Colours*, when they represent themselues to the Eye, fade not, nor melt not by Degrees, but appeare still in the same strength: But *Sounds* melt, and vanish, by little and little. The cause is, for that *Colours* participate nothing with the *Motion* of the *Aire*; but *Sounds* doe. And it is a plaine Argument, that *Sound* participateth of some *Locall Motion*, of the *Aire* (as a Cause *Sinè quâ non*,) in that, it perisheth so suddenly; For in euery Section, or Impulsion of the *Aire*, the *Aire* doth suddenly restore and reunite it selfe; which the *water* also doth, but nothing so swiftly.

Experiments in Consort touching the *Passage*, and *Intercepti*ons of *Sounds*.

In the Trialls of the *Passage*, or *Not Passage* of *Sounds*, you must take heed, you mistake not the *Passing by the Sides* of a Body, for the *Passing thorow* a Body: And therefore you must make the *Intercepting* Body very close; For *Sound* will passe thorow a small Chincke.

212 Where Sound passeth thorow a *Hard*, or *Close Body* (as thorow *water*; thorow a *Wall*; thorow *Metall*, as in Hawkes Bells stopped, &c.) the *Hard*, or *Close Body*, must bee but thin and small; For else it deadeth and extinguisheth the *Sound* vtterly. And therefore in the *Experiment* of *Speaking in Aire vnder water*, the Voice must not be very deepe within the *water*: For then the *Sound* pierceth not. So if you speake on the further side of a *Close wall*, if the *Wall* be very thicke, you shall not be heard: And if there were an Hogshead empty, whereof the Sides were some two Foot thicke, and the bunghole stopped; I conceiue the Resounding Sound, by the *Communication* of the *Outward Aire*, with the *Aire within*, would be little or none. But onely you shall heare the *Noise* of the Outward Knocke, as if the Vessell were full.

213 It is certaine, that in the *Passage* of *Sounds*, thorow *Hard Bodies*, the Spirit or Pneumaticall Part of the Hard Body it selfe, doth cooperate; But much better, when the sides of that *Hard Body* are stricke, than when the Percussion is only within, without Touch of the Sides. Take therefore a Hawkes Bell, the holes stopped vp, and hang it by a threed, within a Bottle Glasse; And stop the Mouth of the Glasse, very close with Wax; And then shake the Glasse, and see whether the Bell giue any *Sound* at all, or how weake? But note, that you must in stead of the Threed take a Wire; Or else let the Glasse haue a great Belly; lest when you shake the Bell, it dash vpon the Sides of the Glasse.

214 It is plaine, that a very *Long*, and *Down-right Arch*, for the *Sound* to passe, will extinguish the *Sound* quite; So that that *Sound*, which would be heard ouer a Wall, will not be heard ouer a Church; Nor that *Sound*, which will bee heard, if you stand some distance from the Wall, will bee heard if you stand close vnder the Wall.

215 *Soft* and *Foraminous Bodies*, in the *first Creation* of the *Sound*, will dead it; For the Striking against Cloth, or Furre, will make little *Sound*; As hath beene said: But in the *Passage* of the *Sound*, they will admit it better than *Harder Bodies*; As wee see, that Curtaines, and Hangings, will not stay the *Sound* much; But Glasse-windowes, if they bee very Close, will checke a *Sound* more, than the like Thicknesse of Cloth. Wee see also, in the Rumbling of the Belly, how easily the *Sound* passeth thorow the Guts, and Skin.

216 It is worthy the Enquiry, whether *Great Sounds* (As of Ordnance, or Bells) become not more *weake*, and *Exile*, when they passe thorow *Small Crannies*. For the *Subtilties* of *Articulate Sounds* (it may be) may passe thorow *Small Crannies*, not confused; But the *Magnitude* of the *Sound* (perhaps) not so well.

Experiments in Consort, touching the *Medium* of *Sounds*.

THe *Mediums* of *Sounds* are *Aire*; *Soft* and *Porous Bodies*; Also *water*. And *Hard Bodies* refuse not altogether to be *Mediums* of *Sounds*. But all of them are dull and vnapt *Deferents*, except the *Aire*.

217 In *Aire*, the Thinner or Drier *Aire*, carrieth not the *Sound* so well, as the more Dense; As appeareth in *Night Sounds*; And *Euening Sounds*;
218 And *Sounds* in moist Weather, and Southerne Winds. The reason is already mentioned in the *Title* of *Maioration* of *Sounds*; Being for that *Thin Aire* is better pierced; but *Tosticke Aire* preserueth the *Sound* better from Wast; Let further Triall bee made by Hollowing in Mists, and Gentle Showers: For (it may be) that will somewhat dead the *Sound*.

219 How farre forth *Flame* may bee a *Medium* of *Sounds* (especially of such *Sounds* as are created by *Aire*, and not betwixt *Hard Bodies*) let it be tried, in *Speaking* where a *Bonfire* is betweene; But then you must allow, for some disturbance, the *Noise* that the *Flame* it selfe maketh.

220 Whether any other *Liquors*, being made *Mediums*, cause a Diuersity of *Sound* from *water*, it may bee tried: As by the Knapping of the Tongs; Or Striking of the Bottome of a Vessell, filled either with Milke,

or with Oyle; which though they be more light, yet are they more vnequall Bodies than Aire.

Of the Natures *of the* Mediums, *we haue now ſpoken*; *As for the* Diſpoſition *of the ſaid* Mediums, *it doth conſiſt in the Penning, or not Penning of the* Aire; *Of which wee haue ſpoken before, in the* Title *of* Delation *of* Sounds: *It conſiſteth alſo in the* Figure *of the* Concaue, *thorow which it paſſeth*; *Of which wee will ſpeake next.*

Experiments in Conſort, what the *Figures* of the *Pipes*, or *Concaues*, or the *Bodies Diferent* conduce to the *Sounds*.

How the *Figures* of *Pipes*, or *Concaues*, thorow which *Sounds* paſſe; Or of other *Bodies different*; conduce to the Variety and Alteration of the *Sounds*; Either in reſpect of the *Greater Quantity*, or *leſſe Quantity* of *Aire*, which the *Concaues* receiue; Or in reſpect of the *Carrying* of *Sounds* longer or ſhorter way; Or in reſpect of many other *Circumſtances*; they haue beene touched, as falling into other *Titles*. But thoſe *Figures*, which we now are to ſpeake of, we intend to be, as they concerne the *Lines* thorow which *Sound* paſſeth; As *Straight*; *Crooked*; *Angular*; *Circular*; &c.

221 The *Figure* of a *Bell* partaketh of the *Pyramis*, but yet comming off, and dilating more ſuddenly. The *Figure* of a *Hunters Horne*, and *Cornet*, is oblique; yet they haue likewiſe *Straight Hornes*; which if they be of the ſame Bore with the *Oblique*, differ little in *Sound*; Saue that the Straight require ſomewhat a ſtronger Blaſt. The *Figures* of *Recorders*, and *Flutes*, and *Pipes* are ſtraight; But the *Recorder* hath a leſſe Bore, and a greater; Aboue, and below. The *Trumpet* hath the *Figure* of the *Letter* S: which maketh that Purling *Sound*, &c. Generally, the *Straight Line* hath the cleaneſt and roundeſt *Sound*, and the *Crooked* the more Hoarſe, and Iarring.

222 Of a *Sinuous Pipe*, that may haue ſome foure Flexions, Triall would be made. Likewiſe of a *Pipe*, made like a *Croſſe*, open in the middeſt. And ſo likewiſe of an *Angular Pipe*: And ſee what will be the Effects of theſe ſeuerall *Sounds*. And ſo againe of a *Circular Pipe*; As if you take a *Pipe* perfect Round, and make a Hole whereinto you ſhall blow; And another Hole not farre from that; But with a Trauerſe or Stop between them; So that your breath may goe the Round of the *Circle*, and come forth at the ſecond Hole. You may trie likewiſe *Percuſſions* of *Solide Bodies* of ſeuerall *Figures*; As *Globes*, *Flats*, *Cubes*, *Croſſes*, *Triangles*, &c. And their *Combinations*; As *Flat* againſt *Flat*; And *Conuex* againſt *Conuex*; And *Conuex* againſt *Flat*, &c. And marke well the diuerſities of the *Sounds*. Trie alſo the difference in *Sound* of ſeuerall *Craſſitudes* of *Hard Bodies* percuſſed. And take knowledge of the diuerſities of the *Sounds*. I my ſelfe haue tryed, that a *Bell* of *Gold* yeeldeth an excellent *Sound*, not inferiour to that of *Siluer*, or *Braſſe*, but rather better: yet we ſee that a peece

peece of Money of *Gold* ſoundeth farre more flat than a peece of Money of *Siluer*.

223 The *Harpe* hath the *Concaue*, not along the *Strings*, but acroſſe the *Strings*; And no *Inſtrument* hath the *Sound* ſo Melting, and Prolonged, as the *Iriſh Harpe*. So as I ſuppoſe, that if a *Virginall* were made with a double *Concaue*; the one all the length as the *Virginall* hath; the other at the End of the *Strings*, as the *Harpe* hath; It muſt needs make the *Sound* perfecter, and not ſo Shallow, and Iarring. You may trie it, without any Sound-Board along, but only Harpe-wiſe, at one end of the *Strings*: Or laſtly with a double *Concaue*, at Each end of the *Strings* one.

Experiments in Conſort, touching the *Mixture* of *Sound*.

224 THere is an apparent Diuerſity between the *Species Viſible*, and *Audible*, in this; That the *Viſible* doth not *mingle* in the *Medium*, but the *Audible* doth. For if we looke abroad, we ſee Heauen, a number of Starres, Trees, Hills, Men, Beaſts, at once. And the *Species* of the one doth not confound the other. But if ſo many ſounds came from ſeuerall Parts, one of them would vtterly confound the other. So wee ſee, that *Voices*, or *Conſorts* of *Muſicke* doe make an Harmony by *Mixture*, which *Colours* doe not. It is true neuertheleſſe, that a great *Light* drowneth a ſmaller, that it cannot be ſeene; As the *Sunne* that of a *Gloworme*; as well as a Great *Sound* drowneth a leſſer. And I ſuppoſe likewiſe that if there were two Lanthornes of Glaſſe, the one a Crimſin, and the other an Azure, and a Candle within either of them, thoſe Coloured Lights would mingle, and caſt vpon a White Paper a Purple Colour. And euen in *Colours*, they yeeld a faint and weake *Mixture*: For white walls make Roomes more lightſome than blacke, &c. But the Cauſe of the *Confuſion* in *Sounds*, and the *Inconfuſion* in *Species Viſible*, is, For that the *Sight* worketh in Right Lines, and maketh ſeuerall *Cones*; And ſo there can be no Coincidence in the Eye, or Viſuall Point: But *Sounds*, that moue in Oblique and Arcuate Lines, muſt needs encounter, and diſturbe the one the other.

225 The ſweeteſt and beſt *Harmony* is, when euery *Part*, or *Inſtrument*, is not heard by it ſelfe, but a Conflation of them all; Which requireth to ſtand ſome diſtance off. Euen as it is in the *Mixture* of Perfumes; Or the Taking of the Smells of ſeuerall *Flowers* in the *Aire*.

226 The *Diſpoſition* of the *Aire*, in other *Qualities*, except it be ioyned with *Sound*, hath no great Operation vpon *Sounds*: For whether the *Aire* be lightſome or darke, hot or cold, quiet or ſtirring, (except it be with *Noiſe*) ſweet-ſmelling, or ſtinking, or the like; it importeth not much: Some petty Alteration or difference it may make.

227 But *Sounds* doe diſturbe and alter the one the other: Sometimes the one drowning the other; and making it not heard; Sometimes the one Iarring and diſcording with the other, and making a Confuſion; Sometimes the one Mingling and Compounding with the other, and making an Harmony.

228 Two *Voices* of like *loudnes*, will not be heard, twice as far, as one of

of them alone; And two *Candles* of like light, will not make Things ſeene twice as farre off, as one. The Cauſe is profound; But it ſeemeth that the *Impreſſions*, from the *Obiects* of the *Senſes*, do *mingle* reſpectiuely, euery one with his kinde; But not in proportion, as is before demonſtrated: And the reaſon may be, becauſe the firſt *Impreſſion*, which is from *Priuatiue* to *Actiue*, (As from *Silence* to *Noiſe*, or from *Darkneſſe* to *Light*,) is a greater Degree, than from *Leſſe Noiſe*, to *More Noiſe*, or from *Leſſe light*, to *More light*. And the Reaſon of that againe may be; For that the *Aire*, after it hath receiued a Charge, doth not receiue a Surcharge, or greater Charge, with like Appetite, as it doth the firſt Charge. As for the Encreaſe of Vertue, generally, what Proportion it beareth to the Encreaſe of the Matter, it is a large field, and to be handled by it ſelfe.

Experiments in Conſort, touching *Meliboration* of *Sounds*.

229 ALL *Reflections Concurrent* doe make *Sounds* Greater; But if the Body that createth, either, the Originall *Sound*, or the *Reflection*, be cleane and ſmooth, it maketh them Sweeter. Tryall may be made of a *Lute* or *Violl*, with the Belly of poliſhed Braſſe, in ſtead of Wood. We ſee that euen in the open Aire, the *Wire String* is ſweeter, than the *String* of *Guts*. And we ſee that for *Reflexion*, *Water* excelleth; As in *Muſicke* neare the *Water*; Or in *Eccho's*.

230 It hath been tryed, that a *Pipe* a little moiſtned on the inſide, but yet ſo as there be no Drops left, maketh a more ſolemne *Sound*, than if the *Pipe* were drie: But yet with a ſweet degree of *Sibillation* or *Purling*, As we touched it before in the title of *Equality*. The Cauſe is, for that all Things Porous, being ſuperficially wet, and (as it were) betweene drie and wet, become a little more Euen and Smooth; But the Purling, (which muſt needs proceed of Inequality,) I take to be bred betweene the Smoothneſſe of the inward Surface of the *Pipe*, which is wet, And the Reſt of the Wood of the *Pipe*, vnto which the Wet commeth not, but it remaineth drie.

231 In *Froſtie weather*, *Muſicke* within doores ſoundeth better. Which may be, by reaſon, not of the Diſpoſition of the *Aire*, but of the *Wood* or *String* of the *Inſtrument*, which is made more Criſpe, and ſo more porous and hollow: And wee ſee that *Old Lutes* ſound better than *New*, for the ſame reaſon. And ſo doe *Lute-ſtrings* that haue beene kept long.

232 *Sound* is likewiſe *Meliorated* by the *Mingling* of *open Aire* with *Pent Aire*; Therefore Tryall may be made of a *Lute* or *Violl* with a double Belly; Making another Belly with a Knot ouer the Strings; yet ſo, as there be Roome enough for the Strings, and Roome enough to play below that Belly: Triall may be made alſo of an *Iriſh Harpe*, with a Concaue on both Sides; Whereas it vſeth to haue it but on one Side. The doubt may be, leſt it ſhould make too much Reſounding; whereby one Note would ouertake another.

233 If you ſing into the Hole of a *Drumme*, it maketh the *Singing* more ſweet.

ſweet. And ſo I conceiue it would, if it were a *Song* in Parts, ſung into ſeuerall *Drums*; And for handſomneſſe and ſtrangeneſſe ſake, it would not be amiſſe to haue a Curtaine betweene the Place where the *Drums* are, and the *Hearers*.

234 When a *Sound* is created in a *Wind-Inſtrument*, betweene the *Breath* and the *Aire*, yet if the *Sound* be communicate with a more equall Bodie of the *Pipe*, it *meliorateth* the *Sound*. For (no doubt) there would be a differing *Sound* in a Trumpet, or *Pipe* of *Wood*; And againe in a *Trumpet* or *Pipe* of *Braſſe*. It were good to trie *Recorders* and *Hunters Hornes* of *Braſſe*, what the *Sound* would be.

235 *Sounds* are *meliorated* by the *Intenſion*, of the *Senſe*; where the *Common Senſe* is collected moſt, to the *Particular Senſe* of *Hearing*, and the *Sight* ſuſpended: And therefore, *Sounds* are ſweeter, (as well as greater,) in the *Night*, than in the *Day*; And I ſuppoſe, they are ſweeter to blinde Men, than to Others: And it is manifeſt, that betweene *Sleeping* and *Waking*, (when all the *Senſes* are bound and ſuſpended) *Muſicke* is farre ſweeter, than when one is *fully waking*.

Experiments in Conſort touching the *Imitation* of *Sounds*.

236 IT is a Thing ſtrange in Nature, when it is attentiuely conſidered, How *Children* and ſome *Birds*, learne to *imitate Speech*. They take no Marke (at all) of the *Motion* of the *Mouth* of Him that ſpeaketh; For *Birds* are as well taught in the Darke, as by Light. The *Sounds* of *Speech* are very Curious and Exquiſite: So one would thinke it were a Leſſon hard to learne. It is true, that it is done with time, and by little and little, and with many Eſſayes and Proffers: But all this diſchargeth not the Wonder. It would make a Man thinke (though this which we ſhall ſay may ſeeme exceeding ſtrange) that there is ſome *Tranſmiſſion* of Spirits; and that the *Spirits* of the *Teacher*, put in Motion, ſhould worke with the *Spirits* of the *Learner*, a Pre-diſpoſition to offer to *Imitate*; And ſo to perfect the *Imitation* by degrees. But touching *Operations* by *Tranſmiſſions* of *Spirits* (which is one of the higheſt Secrets in Nature,) we ſhall ſpeake in due place; Chiefly when wee come to enquire of *Imagination*. But as for *Imitation*, it is certaine, that there is in Men, and other Creatures, a prediſpoſition to *Imitate*. Wee ſee how readie Apes and Monkies are, to *imitate* all Motions of Man: And in the Catching of Dottrells, we ſee, how the Fooliſh Bird playeth the Ape in Geſtures: And no Man (in effect) doth accompany with others, but hee learneth, (ere he is aware,) ſome Geſture, or Voice, or Faſhion of the other.

237 In *Imitation* of *Sounds*, that *Man* ſhould be the *Teacher*, is no Part of the Matter; For *Birds* will learne one of another; And there is no Reward, by feeding, or the like giuen them for the *Imitation*; And beſides, you ſhall haue Parrots, that will not only *imitate* Voyces, but Laughing, Knocking, Squeaking of a Doore vpon the Hinges, or of a Cart-wheele; And (in effect) any other *Noiſe* they heare.

238 No *Beaſt* can *imitate* the *Speech* of *Man*, but *Birds* onely; For the Ape it

it selfe, that is so ready to *imitate* otherwise, attaineth not any degree of *Imitation* of Speech. It is true, that I haue knowne a Dog, that if one howled in his Eare, he would fal a howling a great while: What should be the Aptnesse of *Birds*, in comparison, of *Beasts*, to *imitate* the *Speech* of *Man*, may be further enquired. We see that *Beasts* haue those Parts, which they count the *Instruments* of *Speech*, (as *Lips*, *Teeth*, &c.) liker vnto *Man*, than *Birds*. As for the *Necke*, by which the *Throat* passeth; we see many *Beasts* haue it, for the Length, as much as *Birds*. What better *Gorge*, or Attire, *Birds* haue, may be further enquired. The *Birds* that are knowne to be Speakers, are *Parrots*, *Pyes*, *Iayes*, *Dawes*, and *Rauens*. Of which *Parrots* haue an adunque Bill, but the rest not.

But I conceiue, that the *Aptnesse* of *Birds*, is not so much in the *Conformity* of the *Organs* of *Speech*, as in their *Attention*. For *Speech* must come by *Hearing* and *Learning*; And *Birds* giue more heed, and marke *Sounds*, more than *Beasts*; because naturally they are more delighted with them, and practise them more; As appeareth in their *Singing*. We see also, that those that teach *Birds* to sing, doe keep them Waking, to increase their *Attention*. We see also that *Cocke-Birds* amongst *Singing-Birds*, are euer the better *Singers*; which may be, because they are more liuely, and listen more, 239

Labour, and *Intention* to *imitate voices*, doth conduce much to *Imitation*: And therefore we see, that there be certaine *Pantomimi*, that will represent the voices of *Players* or *Enterludes*, so to life, as if you see them not, you would thinke they were those *Players* themselues; And so the *Voices* of other *Men* that they heare. 240

There haue beene some, that could counterfeit the *Distance* of *Voices* (which is a *Secondary Obiect* of *Hearing*) in such sort; As when they stand fast by you, you would thinke the *Speech* came from a farre off, in a fearefull manner. How this is done, may be further enquired. But I see no great vse of it, but for Impostures, in counterfeiting Ghosts or Spirits. 241

Experiments in Consort touching the *Reflexion* of *Sounds*.

There be three Kinds of *Reflexions* of *Sounds*; A *Reflexion Concurrent*; A *Reflexion Iterant*, which we call *Eccho*; And a *Super-reflextion*, or an *Eccho* of an *Eccho*; whereof the first hath beene handled in the *Title* of *Magnitude* of *Sounds*: The Latter two we will now speake of.

The *Reflexion* of *Species Visible*, by *Mirrours*, you may command; Because passing in Right Lines, they may be guided to any Point: But the *Reflexion* of *Sounds* is hard to master; Because the *Sound* filling great Spaces in Arched Lines, cannot be so guided: And therefore we see there hath not beene practised, any Meanes to make *Artificiall Eccho's*. And no *Eccho* already knowne returneth in a very narrow Roome. 242

The *Naturall Eccho's* are made vpon *Walls*, *Woods*, *Rockes*, *Hills*, and *Bankes*, As for *Waters*, being neere, they make a *Concurrent Eccho*; But being 243

being further off (as vpon a large *Riuer*) they make an *Iterant Eccho*: For there is no difference betweene the *Concurrent Eccho*, and the *Iterant*, but the Quickneſſe, or Slowneſſe of the Returne. But there is no doubt, but *Water* doth help the *Delation* of *Eccho*; as well as it helpeth the *Delation* of *Originall Sounds*.

244 It is certaine (as hath beene formerly touched, that if you ſpeake thorow a *Trunke*, ſtopped at the further end, you ſhall finde a Blaſt returne vpon your Mouth, but no *Sound* at all. The *Cauſe* is, for that the *Cloſeneſſe*, which preſerueth the *Originall*, is not able to preſerue the *Reflected Sound*: Beſides that *Eccho's* are ſeldome created but by loud *Sounds*. And therefore there is leſſe hope of *Artificiall Ecchoes* in *Aire*, pent in a narrow Concaue. Neuertheleſſe it hath bin tried, that One leaning ouer a *Well*, of 25. Fathome deep, and ſpeaking, though but ſoftly, (yet not ſo ſoft as a whiſper) the *Water* returned a good *Audible Eccho*. It would be tried whether Speaking in *Caues*, where there is no Iſſue, ſaue where you ſpeake, will not yeeld *Eccho's*, as *Wells* doe.

245 The *Eccho* commeth as the *Originall Sound* doth, in a Round Orbe of Aire: It were good to try the Creating of the *Eccho*, where the Body Repercuſſing maketh an Angle: As againſt the Returne of a Wall, &c. Alſo we ſee that in *Mirrours*, there is the like Angle of Incidence, from the Obiect to the Glaſſe, and from the Glaſſe to the Eye. And if you ſtrike a *Ball* ſide-long, not full vpon the Surface, the Rebound will be as much the contrary way; Whether there be any ſuch *Reſilience* in *Eccho's*, (that is, whether a Man ſhall heare better, if he ſtand aſide the Body Repercuſſing, than if he ſtand where he ſpeaketh, or any where in a right Line betweene;) may be tried. Triall likewiſe would be made, by ſtanding neerer the Place of Repercuſſing, than hee that ſpeaketh; And againe by ſtanding further off, than he that ſpeaketh; And ſo Knowledge would be taken, whether *Eccho's*, as well as *Orignall Sounds*, be not ſtrongeſt neere hand.

246 There be many Places, where you ſhall heare a Number of *Eccho's* one after another: And it is when there is variety of *Hills* or *Woods*, ſome neerer, ſome further off: So that the Returne from the further, being laſt created, will be likewiſe laſt heard.

247 As the *Voice* goeth round, as well towards the Backe, as towards the Front of him that ſpeaketh; So likewiſe, doth the *Eccho*; For you haue many Back-*Eccho's*, to the Place where you ſtand.

248 To make an *Eccho*, that will report, three, or foure, or fiue Words, diſtinctly, it is requiſite, that the *Body Repercuſſing*, be a good diſtance off: For if it be neere, and yet not ſo neere, as to make a *Concurrent Eccho*, it choppeth with you vpon the ſudden. It is requiſite likewiſe, that the *Aire* be not much *pent*. For *Aire*, at a great diſtance, *pent*, worketh the ſame effect with *Aire*, at *large*, in a ſmall diſtance. And therefore in the *Triall* of *Speaking* in the *Well*, though the *Well* was deepe, the *Voice* came backe, ſuddenly; And would beare the Report but of two Words.

For

For *Eccho's* vpon *Eccho's*, there is a rare Instance thereof in a Place, which I will now exactly describe. It is some three or foure Miles from *Paris*, neere a Towne called *Point-charenton*; And some Bird-bolt shot, or more, from the Riuer of *Seane*. The Roome is a *Chappell*, or small *Church*. The Walls all standing, both at the Sides, and at the Ends. Two Rowes of Pillars, after the manner of Isles of *Churches*, also standing; The Roofe all open, not so much as any Embowment neere any of the walls left. There was against euery Pillar, a Stacke of Billets, aboue a Mans Height; which the Watermen, that bring Wood downe the *Seane* in Stacks, and not in Boats, laid there (as it seemeth) for their ease. Speaking at the one End, I did heare it returne the Voice thirteene seuerall times; And I haue heard of others, that it would returne sixteene times: For I was there about three of the Clocke in the Afternoone: And it is best (as all other *Eccho's* are) in the Euening. It is manifest, that it is not *Eccho's* from seuerall places, but a *Tossing* of the *Voice*, as a Ball, to and fro; Like to *Reflexions* in *Looking-Glasses*; where if you place one *Glasse* before, and another behind, you shall see the *Glasse* behind with the *Image*, within the *Glasse* before; And againe, the *Glasse* before in that; and diuers such *Super-Reflexions*, till the *Species speciei* at last die. For it is euery Returne weaker, and more shady. In like maner, the *Voice* in that *Cappell*, createth *speciem speciei*, and maketh succeeding *Super-Reflexions*; For it melteth by degrees, and euery *Reflexion* is weaker than the former: So that if you speake three Words, it will (perhaps) some three times report you the whole three Words; And then the two latter Words for some times; And then the last Word alone for sometimes; Still fading and growing weaker. And whereas in *Eccho's* of one Returne, it is much to heare foure or fiue Words; In this *Eccho* of so many Returnes, vpon the matter, you heare aboue twenty Words for three. 249

The like *Eccho* vpon *Eccho*, but onely with two Reports, hath beene obserued to be, if you stand betweene a *House*, and a *Hill*, and lure towards the *Hill*. For the *House* will giue a *Back-Eccho*; One taking it from the other, and the latter the weaker. 250

There are certaine *Letters*, that an *Eccho* will hardly expresse; As *S.* for one; Especially being Principall in a Word. I remember well, that when I went to the *Eccho* at *Pont-Charenton*, there was an Old *Parisian*, that tooke it to the Worke of Spirits. And of good Spirits. For (said he) call *Satan*, and the *Eccho*, will not deliuer backe the Deuils name; But will say, *Vat' en*; Which is as much in *French*, as *Apage*, or *Auoid*. And thereby I did hap to finde, that an *Eccho* would not returne *S*, being but a Hissing and an *Interiour Sound*. 251

Eccho's are some more sudden, and chop againe, as soone as the *Voice* is deliuered; As hath beene partly said: Others are more deliberate that is, giue more Space betweene the *Voice* and the *Eccho*, which is caused by the locall Neerenesse, or Distance; Some will report a longer Traine of Words; And some a shorter: Some more loud (full as loud as the *Originall*, 252

ginall, and sometimes more loud;) And some weaker and fainter.

253 Where *Eccho's* come from seuerall Parts, at the same distance, they must needs make (as it were) a Quire of *Eccho's*, and so make the Report greater, and euen a *Continued Eccho*; which you shall finde in some *Hills*, that stand encompassed, Theater-like.

254 It doth not yet appeare, that there is *Refraction* in *Sounds*, as well as in *Species Visible*. For I doe not thinke, that if a *Sound* should passe thorow diuers *Mediums*, (as *Aire*, *Cloth*, *Wood*) it would deliuer the *Sound* in a differing Place, from that vnto which it is deferred; which is the Proper Effect of *Refraction*. But *Maioration*, which is also the Worke of *Refraction*, appeareth plainly in *Sounds* (as hath beene handled at full;) But it is not by Diuersity of *Mediums*.

Experiments in Consort touching the *Consent* and *Dissent* between *Visibles* and *Audibles*.

We haue *obiter*, for Demonstrations sake, vsed in diuers *Instances*, the *Examples* of the *Sight*, and *Things Visible*, to illustrate the *Nature* of *Sounds*. But we thinke good now to posecute that *Comparison* more fully.

CONSENT OF VISIBLES, and Audibles,

255 *Both* of them *spread themselues in Round*, and fill a whole Floare or Orbe, vnto certaine Limits: and are carried a great way: And doe languish and lessen by degrees, according to the Distance of the Obiects from the Sensories.

256 *Both* of them haue the whole *Species in euery small Portion of the Aire*, or *Medium*; So as the *Species* doe passe thorow small Crannies, without Confusion: As we see ordinarily in *Leuels*, as to the *Eye*; And in *Crannies*, or *Chinks*, as to the *Sound*.

257 *Both* of them are of a *sudden and easie Generation* and *Delation*; And likewise *perish swiftly*, and *suddenly*; As if you remoue the *Light*; Or touch the *Bodies* that giue the *Sound*.

258 *Both* of them doe *receiue* and *carry exquisite* and *accurate Differences*; As of Colours, Figures, Motions, Distances, in *Visibles*; And of Articulate Voices, Tones, Songs, and Quauerings, in *Audibles*.

259 *Both* of them in their Vertue and Working, doe not appeare to *emit any Corporall Substance* into their *Mediums*, or the Orbe of their Vertue; Neither againe to raise or stir any *euident locall Motion* in their *Mediums*, as they passe; but onely to carry certaine *Spirituall Species*; The perfect Knowldge of the Cause whereof, being hitherto scarcely attained, we shall search and handle in due place.

260 *Both* of them seeme not to *Generate* or *produce* any other *Effect in Nature*,

rare, but such as appertaineth to their proper Obiects, and Senses, and are otherwise Barren.

But *Both* of them in their owne proper Action, doe worke three manifest *Effects*. The first, in that the *Stronger Species drowneth the Lesser*; As the Light of the Sunne, the Light of a Glow-worme; the Report of an Ordnance, the Voice: The Second, in that an *Obiect of Surcharge or Excesse destroyeth the Sense*; As the Light of the Sunne the Eye, a violent *Sound* (neere the Eare) the Hearing: The Third, in that *both of them will be reuerberate*; As in *Mirrours*; And in *Eccho's*. 261

Neither of them doth *destroy or hinder the Species of the other*, although they *encounter* in the same *Medium*; As Light or Colour hinder not *Sound*, Nor è *contrà*. 262

Both of them *affect the sense in Liuing Creatures*, and yeeld *Obiects of Pleasure and Dislike*: Yet neuertheless, the *Obiects* of them doe also (if it be well obserued) affect and worke vpon dead Things; Namely, such as haue some Conformity with the *Organs* of the two *Senses*; As *Visibles* worke vpon a *Looking-Glasse*, which is like the Pupill of the Eye; And *Audibles* vpon the Places of *Eccho*, which resemble in some sort, the Caueme and structure of the Eare. 263

Both of them doe *diuersly worke, as they haue their Medium diuersly disposed*. So a Trembling *Medium* (as Smoake) maketh the Obiect seeme to tremble; and a Rising or Falling *Medium* (as Winds) maketh the *Sounds* to rise, or fall. 264

To *Both*, the *Medium*, which is the most Propitious and Conducible, is *Aire*; For Glasse or Water, &c. are not comparable. 265

In *Both* of them, where the *Obiect is Fine and Accurate*, it conduceth much to haue the *Sense Intentiue, and Erect*; In so much as you contract your *Eye*, when you would see sharply; And erect your *Eare*, when you would heare attentiuely; which in Beasts that haue Eares moueable, *is* most manifest. 266

The *Beames* of *Light*, when they are *multiplied* and *conglomerate*, generate *Heat*; which is a different Action, from the Action of *Sight*: And the *Multiplication* and *Conglomeration* of *Sounds* doth generate an extreme *Rarefaction* of the *Aire*; which is an Action materiate, differing from the Action of *Sound*; If it bee true (which is anciently reported) that *Birds*, with great shouts, haue fallen downe: 267

DISSENTS OF VISIBLES, and Audibles.

268 THE *Species* of *Visibles* seeme to bee *Emissions* of *Beames* from the *Obiect* seene; Almost like Odours; saue that they are more Incorporeall.: But the *Species* of *Audibles* seeme to Participate more with *Locall Motion*, like *Percussions* or *Impressions* made vpon the *Aire*. So that whereas all Bodies doe seeme to worke in two manners; Either by the *Communication* of their *Natures*; Or by the *Impressions* and *Signatures* of their *Motions*; The *Diffusion* of *Species Visible* seemeth to participate more of the former *Operation*; and the *Species Audible* of the latter.

269 The *Species* of *Audibles* seeme to be carried more manifestly thorow the *Aire*, than the *Species* of *Visibles*: For (I conceiue) that a contrary strong Wind will not much hinder the Sight of *Visibles*, as it will doe the Hearing of *Sounds*.

270 There is one *Difference*, aboue all others, betweene *Visibles* and *Audibles*, that is the most remarkable; As that whereupon many smaller Differences doe depend: Namely, that *Visibles*, (except *Lights*,) are *carried in Right Lines*; and *Audibles* in *Arcuate Lines*. Hence it commeth to passe, that *Visibles* doe not intermingle, and confound one another, as hath beene said before; But *Sounds* doe. Hence it commeth, that the Solidity of Bodies doth not much hinder the Sight, so that the Bodies bee cleare, and the Pores in a Right Line, as in Glasse, Crystall, Diamonds, Water, &c. But a thin Scarfe, or Handkerchiefe; though they bee Bodies nothing so Solid, hinder the Sight: Whereas (contrariwise) these Porous Bodies doe not much hinder the Hearing, but Solid Bodies doe almost stop it, or at the least attenuate it. Hence also it commeth, that to the *Reflexion* of *Visibles*, small Glasses suffice; but to the *Reuerberation* of *Audibles*, are required greater Spaces, as hath likewise beene said before.

271 *Visibles* are seene further off, than *Sounds* are heard; Allowing neuertheless the *Rate* of their *Bignesse*: For otherwise a *great Sound* will bee heard further off, than a *Small Body* seene.

272 *Visibles* require (generally) some *Distance* betweene the *Obiect*, and the *Eye*, to bee better seene; Whereas in *Audibles*, the neerer the Approach of the *Sound* is to the Sense, the better. But in this there may bee a double Errour. The one, because to *Seeing*, there is required *Light*; And any thing that toucheth the Pupill of the Eye (all ouer) excludeth the *Light*. For I haue heard of a Person very credible (who himselfe was cured

cured of a Cataract in one of his Eyes) that while the Siluer Needle did worke vpon the Sight of his Eye, to remoue the Filme of the Cataract, hee neuer saw any thing more cleare or perfect, than that white Needle: Which (no doubt) was, because the Needle was lesser than the *Pupill* of the *Eye*, and so tooke not the Light from it. The other Errour may be, for that the *Obiect* of *Sight* doth strike vpon the *Pupill* of the *Eye*, directly without any interception; whereas the *Caue* of the *Eare* doth hold off the *Sound* a little from the Organ: And so neuertheless there is some *Distance* required in both.

Visibles are swiftlier carried to the *Sense*, than *Audibles*; As appeareth in Thunder and Lightning; Flame and the Report of a Peece; Motion of the Aire in Hewing of Wood. All which haue beene set downe heretofore, but are proper for this *Title*. 273

I conceiue also, that the *Species of Audibles* doe hang longer in the Aire, than those of *Visibles*: For although euen those of *Visibles*, doe hang some time, as we see in *Rings turned*, that shew like Spheres; In *Lute-strings* fillipped; A *Fire-Brand* carried along, which leaueth a Traine of Light behind it; And in the *Twi-light*; And the like: Yet I conceiue that *Sounds* stay longer, because they are carried vp and downe with the Wind: And because of the Distance of the Time in *Ordnance discharged*, and *heard* 20. Miles off. 274

In *Visibles*, there are not found Obiects so Odious and Ingrate to the *Sense*, as in *Audibles*. For foule *Sights* doe rather displease, in that they excite the Memory of foule Things, than in the immediate Obiects. And therefore in *Pictures*, those foule Sights doe not much offend; But in *Audibles*, the Grating of a Saw, when it is sharpned, doth offend so much, as it setteth the Teeth on Edge. And any of the *harsh Discords* in *Musicke*, the Eare doth straight-waies refuse. 275

In *Visibles*, after great Light, if you come suddenly into the *Darke*; Or contrariwise, out of the *Darke* into a *Glaring Light*, the Eye is dazled for a time, and the *Sight* confused; But whether any such Effect be after great *Sounds*, or after *a deepe Silence*, may be better enquired. It is an old Tradition, that those that dwell neere the *Cataracts* of *Nilus*, are strucken deafe: But wee finde no such Effect, in Cannoniers, nor Millers, nor those that dwell vpon Bridges. 276

It seemeth that the *Impression* of *Colour* is so weake, as it worketh not but by a Cone of Direct *Beames*, or Right Lines; whereof the Basis is in the Obiect, and the Verticall Point in the Eye: So as there is a Corradiation and Coniunction of *Beames*; And those *Beames* so sent forth, yet are not of any force to beget the like borrowed or second *Beames*, except it be by *Reflexion*, whereof we speake not. For the *Beames* passe, and giue little Tincture to that Aire, which is Adiacent; which if they did, wee should see *Colours* out of a Right line. But as this is in *Colours*, so otherwise it is in the *Body* of *Light*. For when there is a Skreene betweene the Candle and the Eye, yet the *Light* passeth to the Paper whereon One writeth; So that the *Light* is seene, where the Body of the *Flame* is not 277

seene; And where any *Colour* (if it were placed where the Body of the *Flame* is) would not bee seene. I iudge that *Sound* is of this Latter Nature: For when two are placed on both sides of a Wall, and the Voice is heard, I iudge it is not onely the *Originall Sound*, which passeth in an *Arched Line*; But the *Sound*, which passeth aboue the Wall in a Right Line, begetteth the like Motion round about it, as the first did, though more weake.

Experiments in Consort, touching the *Sympathy* or *Antipathy* of *Sounds*, one with another.

ALL *Concords* and *Discords* of *Musicke*, are, (no doubt) *Sympathies*, and *Antipathies* of *Sounds*. And so (likewise) in that *Musicke*, which wee call *Broken Musicke*, or *Consort Musicke*; Some *Consorts* of *Instruments* are sweeter than others; (A Thing not sufficiently yet obserued:) As the *Irish Harpe*, and *Base Viall* agree well: The *Recorder* and *Stringed Musicke* agree well: *Organs* and the *Voice* agree well; &c. But the *Virginalls* and the *Lute*; Or the *Welsh-Harpe*, and *Irish Harpe*; Or the *Voice* and *Pipes* alone, agree not so well; But for the *Melioration* of *Musicke*, there is yet much left (in this Point of *Exquisite Consorts*) to try and enquire.

278

279 There is a Common Obseruation, that if a *Lute*, or *Viall*, bee layed vpon the Backe, with a small Straw vpon one of the *Strings*; And another *Lute* or *Viall* bee laid by it; And in the other *Lute* or *Viall*, the *Vnison* to that *String* bee stricken; it will make the *String* moue; Which will appeare both to the Eye, and by the *Strawes* falling off. The like will bee, if the *Diapason* or *Eight* to that *String* bee stricken, either in the same *Lute* or *Viall*, or in others lying by; But in none of these there is any Report of *Sound*, that can bee discerned, but onely Motion.

280 It was deuised, that a *Viall* should haue a Lay of Wire Strings below, as close to the Belly, as a *Lute*; And then the *Strings* of Guts mounted vpon a Bridge, as in Ordinary *Vialls*; To the end, that by this meanes, the vpper *Strings* stricken, should make the lower resound by *Sympathy*, and so make the *Musicke* the better; Which, if it bee to purpose, then *Sympathy* worketh, as well by Report of *Sound*, as by *Motion*. But this deuice I conceiue to be of no vse; because the vpper *Strings*, which are stopped in great variety, cannot maintaine a *Diapason* or *Vnison*, with the Lower, which are neuer stopped. But if it should bee of vse at all; it must be in *Instruments* which haue no Stops; as *Virginalls*, and *Harps*; wherein triall may bee made of two Rowes of Strings, distant the one from the other.

281 The *Experiments* of *Sympathy* may bee transferred (perhaps) from *Instruments* of *Strings*, to other *Instruments* of *Sound*. As to try if there were in one Steeple, two *Bells* of *Vnison*, whether the striking of the one would moue the other, more than if it were another Accord: And so in *Pipes* (if they bee of equall Bore, and *Sound*) whether a little Straw or Feather would moue in the one *Pipe*, when the other is blowne at an *Vnison*.

It

It seemeth, both in *Eare*, and *Eye*, the *Instrument* of *Sense* hath a *Sympathy* or Similitude with that which giueth the *Reflection*; (As hath beene touched before.) For as the *Sight* of the *Eye* is Like a Crystall, or Glasse, or Water; So is the *Eare* a sinuous Caue, with a hard Bone, to stop and reuerberate the *Sound*: Which is like to the Places that report *Eccho's*. 282

Experiments in Consort, touching the *Hindering* or *Helping* of the *Hearing*. 283

When a Man *Yawneth*, he cannot *Heare* so well. The *Cause* is, for that the *Membrane* of the *Eare* is extended; And so rather casteth off the *Sound*, than draweth it to.

We *Heare* better when we *hold our Breath*, than contrary; In so much as in all Listening to attaine a *Sound* a farre off, Men *hold their Breath*. The *Cause* is, For that in all *Expiration*, the Motion is Outwards; And therefore, rather driueth away the voice, than draweth it: And besides wee see, that in all *Labour* to doe things with any strength, we *hold the Breath*: And listening after any *Sound*, that is heard with difficulty, is a kinde of *Labour*. 284

Let it be tried, for the *Helpe* of the *Hearing*, (and I conceiue it likely to succeed,) to make an *Instrument* like a *Tunnell*; The narrow Part whereof may be of the Bignesse of the Hole of the *Eare*; And the Broader End much larger, like a *Bell* at the Skirts; And the length halfe a foot, or more. And let the narrow end of it be set close to the *Eare*: And marke whether any *Sound*, abroad in the open Aire, will not be heard distinctly, from further distance, than without that Instrument; being (as it were) an *Eare-Spectacle*. And I haue heard there is in *Spaine*, an *Instrument* in vse to be set to the *Eare*, that *helpeth* somewhat those that are Thicke of Hearing. 285

If the *Mouth* be shut close, neuertheless there is yeelded by the Roose of the Mouth, a Murmur. Such as is vsed by dumbe Men: But if the *Nostrils* be likewise stopped, no such Murmure can be made; Except it be in the Bottome of the Pallate towards the Throat. Whereby it appeareth manifestly, that a *Sound* in the *Mouth*, except such as afore said, if the *Mouth* be stopped, passeth from the *Pallat*, thorow the *Nostrils*.

Experiments in Consort, touching the *Spirituall* and *Fine Nature* of *Sounds*. 287

The *Repercussion* of *Sounds*, (which wee call *Eccho*,) is a great Argument of the *Spirituall Essence* of *Sounds*. For if it were *Corporeall*, the Repercussion should be created in the same manner, and by like *Instruments*, with the *Originall Sound*: But we see what a Number of *Exquisite Instruments* must concurre in Speaking of Words, whereof there is no such Matter in the Returning of them; But only a plaine Stop, and *Repercussion*.

The Exquisite *Differences* of *Articulate Sounds*, carried along in the *Aire*, shew that they cannot be *Signatures* or *Impressions* in the *Aire*, as hath beene well refuted by the Ancients. For it is true, that Seales make excellent Impressions: And so it may bee thought of *Sounds* in 288

their

their first Generation: But then the *Delation* and *Continuance* of them without any new Sealing, shew apparantly they cannot be Impressions.

289 All *Sounds* are suddenly made, and doe suddenly perish; But neither that, nor the *Exquisite Differences* of them, is Matter of so great Admiration: For the Quauerings, and Warblings in Lutes, and Pipes, are as swift; And the Tongue, (which is no very fine Instrument,) doth in Speech, make no fewer Motions, than there be Letters in all the Words, which are vttered. But that *Sounds* should not only be so speedily generated, but carried so farre euery way, in such a momentanie time, deserueth more Admiration. As for Example; If a Man stand in the middle of a Field and speake aloud, he shall be heard a Furlong in round; And that shall be in *Articulate Sounds*; And those shall be Entire in euery little Portion of the Aire; And this shall be done in the Space of lesse than a Minute.

290 The *Sudden Generation* and *Perishing* of *Sounds*, must be one of these two Wayes. Either that the *Aire* suffereth some Force by *Sound*; and then restoreth it selfe; As Water doth; Which being diuided, maketh many Circles, till it restore it selfe to the naturall Consistence: Or otherwise, that the *Aire* doth willingly imbibe the *Sound* as gratefull, but cannot maintaine it; For that the *Aire* hath (as it should seeme) a secret and hidden Appetite of Receiuing the *Sound* at the first; But then other Grosse and more Materiate Qualities of the Aire straightwayes suffocate it; Like vnto *Flame*, which is generated with Alacritie, but straight quenched by the Enmitie of the *Aire*, or other Ambient Bodies.

There be these *Differences* (in generall) by which *Sounds* are diuided; 1. *Musicall, Immusicall*; 2. *Treble, Base*; 3. *Flat, Sharpe*; 4. *Soft, Loud*; 5. *Exteriour, Interiour*; 6. *Cleane, Harsh* or *Purling*; 7. *Articulate, Inarticulate*.

We haue laboured (as may appeare,) in this *Inquisition* of *Sounds*, diligently; Both because *Sound* is one of the most Hidden Portions of *Nature*, (as we said in the beginning:) And because it is a *Vertue* which may be called *Incorporeall*, and *Immateriate*; whereof there be in *Nature* but few. Besides, we were willing, (now in these our first *Centuries*,) to make a Patterne or President of an *Exact Inquisition*; And we shall doe the like hereafter in some other Subiects which require it. For wee desire that Men should learne and perceiue, how seuerea Thing the true *Inquisition* of *Nature* is; And should accustome

cuſtome themſelues, by the light of Particulars to enlarge their Mindes, to the Amplitude of the world; And not reduce the World to the Narrowneſſe of their Mindes.

Metalls giue *Orient* and *Fine Colours* in *Diſſolutions*; As *Gold* giueth an excellent Yellow; *Quicke-Siluer* an excellent Green; *Tin* giueth an excellent Azure: Likewiſe in their *Putrefactions*, or *Ruſts*; As *Vermilion*, *Verdegreaſe*, *Biſe*, *Cirrus*, &c. And likewiſe in their *Vitrifications*. The *Cauſe* is, for that by their Strength of Body, they are able to endure the Fire, or Strong Waters, and to be put into an Equall Poſture, and againe to retaine Part of their principall Spirit; Which two Things, (Equall Poſture, and Quicke Spirits) are required chiefly, to make *Colours* lightſome.

Experiment Solitary touching the *Orient Colours* in *diſſolution* of *Metalls*. 291

IT conduceth vnto *Long Life*, and to the more Placide motion of the Spirits, which thereby doe leſſe prey and conſume the Iuyce of the Body; Either that *Mens Actions be free and voluntary*; That nothing be done *Inuitâ Minervâ*, but *Secundum Genium*: Or on the other ſide, that the *Actions* of *Men be full of Regulation, and Commands within themſelues*: For then the Victory and Performing of the Command, giueth a good Diſpoſition to the Spirits, Eſpecially if there be a Proceeding from Degree to Degree; For then the Senſe of Victory is the greater. An example of the former of theſe, is in a Country life; And of the latter, in *Monkes* and *Philoſophers*, and ſuch as doe continually enioyne themſelues.

Experiment Solitary touching *Prolongation* of *Life*. 292

IT is certaine, that in all Bodies, there is an *Appetite* of *Vnion*, and Euitation of Solution of Continuity: And of this *Appetite* there be many *Degrees*; But the moſt Remarkable, and fit to be diſtinguiſhed, are three. The firſt in *Liquors*; The ſecond in *Hard Bodies*: And the third in *Bodies Cleauing* or *Tenacious*. In *Liquors*, this *Appetite* is weake: Wee ſee in *Liquors*, the *Thredding* of them in *Stillicides*, (as hath beene ſaid;) The *Falling* of them in *Round Drops*, (which is the forme of *Vnion*;) And the *Staying* of them, for a little time, in *Bubbles* and *Froth*. In the ſecond *Degree* or *Kinde*, this *Appetite* is ſtrong; As in *Iron*, in *Stone*, in *Wood*, &c. In the third, this *Appetite* is in a *Medium* betweene the other two: For ſuch *Bodies* doe partly follow the Touch of another Bodie; And partly ſticke and continue to themſelues; And therefore they roape, and draw themſelues in Threds; As we ſee in *Pitch*, *Glew*, *Birdlime*, &c. But note, that all *Solide Bodies* are *Cleauing*, more or leſſe: And that they loue better the Touch of ſomewhat that is *Tangible*, than of *Aire*. For *Water*, in ſmall quantity, cleaueth to any Thing that is Solid; And ſo would *Metall* too, if the weight drew it not off. And therefore *Gold Foliate*, or any *Metall Foliate*, cleaueth: But thoſe *Bodies* which are noted to be Clammie, and Cleauing, are ſuch, as haue a more indifferent *Appetite* (at once,) to follow another *Bodie*; And to hold to them-

Experiment Solitary touching *Appetite of Vnion* in *Bodies*. 293

themſelues. And therefore they are commonly *Bodies* ill mixed; And which take more pleaſure in a Forraine Body, than in preſeruing their owne *Conſiſtence*; And which haue little predominance in *Drought*, or *Moiſture*.

Experiment Solitary touching the *like Operations* of *Heat*, and *Time*. 294

Time, and *Heat*, are Fellowes in many Effects. *Heat* drieth Bodies, that doe eaſily expire; As Parchment, Leaues, Roots, Clay, &c. And, ſo doth *Time* or *Age* are ſie; As in the ſame Bodies, &c. *Heat* diſſolueth and melteth Bodies, that keepe in their Spirits; As in diuers *Liquefactions*; And ſo doth *Time*, in ſome Bodies of a ſofter Conſiſtence: As is manifeſt in Honey, which by *Age* waxeth more liquid; And the like in Sugar; and ſo in old Oyle, which is euer more cleare, and more hot in Medicinable vſe. *Heat* cauſeth the Spirits to ſearch ſome Iſſue out of the Body; As in the *Volatility* of *Metalls*; And ſo doth *Time*; As in the *Ruſt* of *Metalls*. But generally *Heat* doth that in ſmall time, which *Age* doth in long.

Experiment Solitary touching the *differing Operations* of *Fire*, and *Time*. 295

Some things which paſſe the *Fire* are ſofteſt at firſt, and by *Time* grow hard; As the Crumme of Bread. Some are harder when they come from the *Fire*, and afterwards giue againe, and grow ſoft, as the Cruſt of Bread, Biſket, Sweet Meats, Salt, &c. The *Cauſe* is, for that in thoſe things which wax Hard with *Time*, the Worke of the *Fire* is a Kinde of *Melting*: And in thoſe that wax Soft with *Time*, (contrariwiſe,) the worke of the *Fire* is a Kinde of *Baking*; And whatſoeuer the *Fire* baketh, *Time* doth in ſome degree diſſolue.

Experiment Solitary touching *Motions* by *Imitation*. 296

Motions paſſe from one Man to another, not ſo much by Exciting Imagination; as by Inuitation; Eſpecially if there be an Aptneſſe or Inclination before. Therefore *Gaping*, or *Yawning*, and *Stretching* doe paſſe from Man to Man; For that that cauſeth *Gaping* and *Stretching* is, when the Spirits are a little Heauy, by any Vapour, or the like. For then they ſtriue, (as it were,) to wring out, and expell that which loadeth them: So Men drowzie, and deſirous to ſleepe; Or before the Fit of an Ague; doe vſe to Yawne and Stretch; And doe likewiſe yeeld a *Voice* or *Sound*, which is an *Interiection* of *Expulſion*: So that if another be apt and prepared to doe the like, he followeth by the Sight of another. So the *Laughing* of another maketh to *Laugh*.

Experiment Solitary touching *Infectious Diſeaſes*. 297

There be ſome knowne *Diſeaſes* that are *infectious*; And Others that are not. Thoſe that are *infectious*, are; Firſt, ſuch as are chiefely in the *Spirits*, and not ſo much in the *Humours*; And therefore paſſe eaſily from Body to Body: Such are *Peſtilences*, *Lippitudes*, and ſuch like. Secondly, ſuch as *Taint* the *Breath*; Which wee ſee paſſeth manifeſtly from Man to Man; And not inuiſibly, as the *Affects* of the *Spirits* doe: Such are *Conſumptions* of the *Lungs*, &c. Thirdly, ſuch as come forth to the *Skinne*; And therefore taint the *Aire*, or the *Body Adiacent*;

Adiacent; Especially if they consist in an Vnctuous Substance, not apt to dissipate; Such are *Scabs*, and *Leprousie*. Forthly, such as are meerely in the *Humours*, and not in the *Spirits*, *Breath*, or *Exhalations*: And therefore they neuer infect, but by *Touch* only; And such a *Touch* also as commeth within the *Epidermis*; As the Venome of the *French Pox*; And the *Biting* of a *Mad Dog*.

Most *Powders* grow more Close and Coherent by *Mixture* of *Water*, than by *Mixture* of *Oyle*, though *Oyle* be the thicker Body; As *Meale*; &c. The Reason is the Congruity of Bodies; which if it be more, maketh a perfecter Imbibition, and Incorporation; Which in most *Powders* is more beweene *Them* and *Water*, than betweene *them* and *Oyle*: But *Painters Colours* ground, and *Ashes*, doe better incorporate with *Oyle*.

Experiment Solitary touching the *Incorporation* of *Powders* and *Liquors*. 298

Much *Motion* and *Exercise* is good for some *Bodies*; And *Sitting*, and *lesse Motion* for Others. If the Body be Hot, and Void of Superfluous Moistures, too much *Motion* hurteth: And it is an Errour in *Physitians*, to call too much vpon *Exercise*. Likewise Men ought to beware, that they vse not *Exercise*, and a *Spare Diet* both: But if much *Exercise*, then a *Plentifull Diet*; And if *Sparing Diet*, then little *Exercise*. The *Benefits* that come of *Exercise* are, First, that it sendeth *Nourishment* into the Parts more forcibly. Secondly, that helpeth to Excerne by *Sweat*; and so maketh the Parts assimilate the more perfectly. Thirdly, that it maketh the *Substance* of the *Body* more *Solide* and *Compact*; And so lesse apt to be Consumed and Depredated by the *Spirits*. The *Euills* that come of *Exercise*, are: First, that it maketh the *Spirits* more Hot and Predatory. Secondly, that it doth absorbe likewise, and attenuate too much the Moisture of the *Body*. Thirdly, that it maketh too great *Concussion*, (especially if it be violent,) of the *Inward Parts*; which delight more in Rest. But generally *Exercise*, if it be much, is no Friend to *Prolongation* of *Life*; Which is one cause, why *Women* liue longer than *Men*, because they stirre lesse.

Experiment Solitary touching *Exercise* of the *Body*. 299

Some *Food* we may vse *long*, and *much* without *Glutting*; As Bread, Flesh that is not fat, or ranke, &c. Some other, (though pleasant,) *Glutteth* sooner; As Sweet Meats, Fat Meats, &c. The *Cause* is, for that *Appetite* consisteth in the Emptinesse of the Mouth of the Stomacke; Or possessing it with somewhat that is Astringent; And therefor Cold and Drie. But things that are *Sweet* and *Fat*, are more Filling: And doe swimme and hang more about the Mouth of the Stomacke; And goe not downe so speedily: And againe turne sooner to *Choler*, which is hot, and euer abateth the Appetite. Wee see also, that another *Cause* of *Saciety*, is an *Ouer-custome*; and of *Appetite* is *Noueltie*: And therefore *Meats*, if the same be continually taken, induce *Loathing*. To giue the Reason of the *Distaste* of *Saciety*, and of the *Pleasure*

Experiment Solitary touching *Meats*, that *induce Sacietie*. 300

ſure in *Noueltie*; and to diſtinguiſh not onely in Meats and Drinkes, but alſo in Motions, Loues, Company, Delights, Studies, what they be that *Cuſtome* maketh more gratefull; And what more tedious; were a large Field. But for *Meats*, the Cauſe is *Attraction*, which is quicker; and more excited toward that which is new, than towards that whereof there remaineth a Relliſh by former vſe. And (generally) it is a Rule, that whatſoeuer is ſomewhat Ingrate at firſt, is made Gratefull by *Cuſtome*; But whatſoeuer is too Pleaſing at firſt groweth quickly to *ſatiate*.

NATV-

NATVRALL HISTORIE.

IV. Century.

ACCELERATION of *Time* in *Works* of *Nature*, may well be esteemed *Inter Magnalia Naturæ*. And euen in *Diuine Miracles*, *Accelerating* of the *Time*, is next to the *Creating* of the *Matter*. We will now therefore proceed to the Enquiry of it: And for *Acceleration* of *Germination*, wee will referre it ouer, vnto the place, where wee shall handle the Subiect of *Plants*, generally; And will now begin with other *Accelerations*.

Experiments in Consort touching the *Clarification* of *Liquors*, and the *Accelerating* thereof.

Liquors are (many of them) at the first, thicke and troubled: As *Must*, *Wort*, *Iuyces* of *Fruits*, or *Herbs* expressed, &c. And by *Time* they settle and Clarifie. But to make them cleare before the *Time*, is a great Worke; For it is a Spurre to Nature, and putteth her out of her pace: And besides, it is of good vse, for making *Drinkes*, and *Sauces*, Potable, and Seruiceable, speedily; But to know the *Meanes* of *Accelerating Clarification*, we must first know the *Causes* of *Clarification*. The first *Cause* is, by the *Separation* of the *Grosser Parts* of the *Liquor*, from the *Finer*. The second, by the *Equall Distribution* of the *Spirit* of the *Liquor*, with the *Tangible Parts*: For that euer representeth Bodies Cleare and Vntrou- 301

bled. The third, by the *Refining* the *Spirit it selfe*, which thereby giueth to the *Liquor* more Splendor, and more Lustre.

302 First, for *Separation*; It is wrought by *weight*; As in the ordinary Residence or Settlement of *Liquors*: By *Heat*: By *Motion*. By *Precipitation*, or *Sublimation*; (That is, a calling of the seuerall Parts, either vp, or downe, which is a kinde of *Attraction*:) By *Adhesion*; As when a Body more *Viscous* is mingled and agitated with the *Liquor*; which Viscous Body (afterwards seuered) draweth with it the grosser parts of the *Liquor*: And Lastly, By *Percolation* or *Passage*.

303 Secondly, for the *Euen Distribution* of the *Spirits*; It is wrought by *Gentle Heat*; And by *Agitation* or *Motion*; (For of *Time* wee speake not, because it is that, we would anticipate and represent:) And it is wrought also, by *Mixture* of some other *Body*, which hath a vertue to open the *Liquor*, and to make the *Spirits* the better passe thorow.

304 Thirdly, for the *Refining* of the *Spirit*, it is wrought likewise by *Heat*, By *Motion*; And by *Mixture* of some *Body* which hath *Vertue to attennate*. So therefore (hauing shewne the *Causes*) for the *Accelerating* of *Clarification*, in generall, and the *Enducing* of it; take these *Instances*, and *Trialls*.

305 It is in common Practice, to draw *Wine*, or *Beere*, from the *Lees*, (which we call *Racking*;) whereby it will *Clarifie* much the sooner: For the *Lees*, though they keepe the *Drinke* in Heart, and make it lasting; yet withall they cast vp some Spissitude: And this *Instance* is to bee referred to *Separation*.

306 On the other side, it were good to try, what the Adding to the *Liquour* more *Lees* than his owne will worke; For though the *Lees* doe make the *Liquour* turbide, yet they refine the *Spirits*. Take therefore a Vessell of *New Beere*; And take another Vessell of *New Beere*, and Racke the one Vessell from the *Lees*, and powre the *Lees* of the Racked Vessell into the vnracked Vessell, and see the Effect: This *Instance* is referred to the *Refining* of the *Spirits*.

307 Take *New Beere*, and put in some Quantity of *Stale Beere* into it, and see whether it will not accelerate the *Clarification*, by Opening the Body of the *Beere*, and Cutting the Grosser Parts, whereby they may fall downe into *Lees*. And this *Instance* againe is referred to *Separation*.

308 The longer *Malt*, or *Herbs*, or the like, are infused in *Liquor*, the more thicke and troubled the *Liquor* is; But the longer they bee decocted in the *Liquor*, the clearer it is. The Reason is plaine, because in *Infusion*, the longer it is, the greater is the Part of the Grosse Body, that goeth into the *Liquor*: But in *Decoction*, though more goeth forth, yet it either purgeth at the Top, or setleth at the Bottome. And therefore the most Exact Way to *Clarifie* is; First, to *Infuse*, and then to take off the *Liquor* and *Decoct* it; as they doe in *Beere*, which hath *Malt* first Infused in the *Liquor*, and is afterwards boiled with the Hop. This also is referred to *Separation*.

309 Take *Hot Embers*, and put them about a Bottle filled with *New Beere*, almost

almost to the very Necke: Let the Bottle be well stopped, lest it flie out: And continue it, renewing the *Embers* euery day, by the space of Ten Dayes; And then compare it with another Bottle of the same *Beere* set by. Take also Lime both *Quenched* and *Vnquenched*, and set the Bottles in them, *vt supra*. This *Instance* is referred, both to the *Euen Distribution*, and also to the *Refining* of the *Spirits* by *Heat*.

Take *Bottles*, and *Swing* them; Or *Carry* them in a *Wheele-Barrow*, vpon *Rough Ground*; twice in a day: But then you may not fill the *Bottles* full, but leaue some Aire; For if the *Liquor* come close to the Stopple, it cannot play, nor flower: And when you haue shaken them well, either way, powre the *Drink* into another Bottle, stopped close, after the vsuall manner; For if it stay with much Aire in it, the *Drinke* will pall; neither will it settle so perfectly in all the Parts. Let it stand some 24. houres: Then take it, and put it againe into a *Bottle* with *Aire*, *vt supra*: And thence into a *Bottle stopped*, *vt supra*: And so repeat the same *Operation* for seuen dayes. Note that in the Emptying of one Bottle into another, you must doe it swiftly, lest the *Drinke* pall. It were good also, to try it in a *Bottle* with a little Aire below the Necke, without Emptying. This *Instance* is referred to the *Euen distribution* and *Refining* of the *Spirits* by *Motion*. 310

As for *Percolation*, *Inward* and *Outward*, (which belongeth to *Separation*,) Triall would be made, of *Clarifying* by *Adhesion*, with *Milke* put into *New Beere*, and stirred with it: For it may bee that the Grosser Part of the *Beere* will cleaue to the *Milke*: The Doubt is, whether the *Milke* will seuer well againe; Which is soone tried. And it is vsuall in *Clarifying Ippocrasse* to put in *Milke*, Which after seuereth and carrieth with it the *Grosser Parts* of the *Ippocrasse*, as hath beene said elsewhere. Also for the better *Clarification* by *Percolation*, when they tun *New Beere*, they vse to let it passe thorow a *Strainer*; And it is like, the finer the *Strainer* is, the cleerer it will be. 311

The *Accelerating* of *Maturation* wee will now enquire of. And of *Maturation* it selfe. It is of three Natures, The *Maturation* of *Fruits*: The *Maturation* of *Drinkes*: And the *Maturation* of *Impostumes* and *Vlcers*. This last wee referre to another Place, where wee shall handle *Experiments Medicinall*. There bee also other *Maturations*, as of *Metalls*, &c. whereof wee will speake as Occasion serueth. But wee will begin with that of *Drinkes*, because it hath such Affinity with the *Clarification* of *Liquors*.

Experiments in Consort touching *Maturation*, and the *Accelerating* thereof. And first touching the *Maturation* and *Quickning* of *Drinks*. And next touching the *Maturation* of *Fruits*.

For the *Maturation* of *Drinkes*, it is wrought by the *Congregation* of the *Spirits* together, whereby they digest more perfectly the Grosser Parts: And it is effected partly, by the same meanes, that *Clarification* is (whereof wee spake before;) But then note, that an Extreme *Clarification* doth 312

ſpread the *Spirits* ſo Smooth, as they become Dull, and the *Drinke* dead, which ought to haue a little Flouring. And therefore all your Cleare *Amber Drinke* is flat.

313 We ſee the *Degrees* of *Maturation* of *Drinkes*; In *Muſt*; In *Wine*, as it is drunke; And in *Vinegar*. Where of *Muſt* hath not the *Spirits* well Congregated; *Wine* hath them well vnited; ſo as they make the Parts ſomewhat more Oyly: *Vinegar* hath them Congregated, but more Ieiune, and in ſmaller Quantity; The greateſt and fineſt Spirit and Part being exhaled: For we ſee *Vinegar* is made by ſetting the Veſſell of *Wine* againſt the hot Sun: And therefore *Vinegar* will not burne; For that much of the Finer Parts is Exhaled.

314 The *Refreſhing* and *Quickning* of *Drinke* Palled, or Dead, is by *Enforcing* the *Motion* of the *Spirit*: So wee ſee that *Open weather* relaxeth the *Spirit*, and maketh it more liuely in *Motion*. Wee ſee alſo *Bottelling* of *Beere*, or *Ale*, while it is New, and full of *Spirit* (ſo that it ſpirteth when the Stopple is taken forth) maketh the *Drinke* more quicke and windy. A *Pan* of *Coales* in the *Cellar* doth likewiſe good, and maketh the *Drinke* worke againe. *New Drinke*, put to *Drinke* that is *Dead*, prouoketh it to worke againe: Nay, which is more (as ſome affirme) *A Brewing of New Beere*, ſet by *Old Beere*, maketh it worke againe. It were good alſo to *Enforce* the *Spirits* by ſome *Mixtures*, that may excite and quicken them; As by putting into the *Bottles*, *Nitre*, *Chalke*, *Lime*, &c. Wee ſee *Creame* is *Matured*, and made to riſe more ſpeedily, by Putting in *Cold Water*; which, as it ſeemeth, getteth downe the *Whey*.

315 It is tried, that the *Burying* of *Bottles of Drinke* well ſtopped, either in *dry Earth*, a good depth; Or in the *Bottome* of a *well within Water*; And beſt of all the *Hanging* of them in a *deepe Well* ſomewhat *aboue the Water*, for ſome fortnights ſpace, is an Excellent *Meanes* of making *Drinke* freſh, and quicke: for the *Cold* doth not cauſe any Exhaling of the *Spirits* at all; As *Heat* doth, though it rarifieth the reſt that remaine: But *Cold* maketh the *Spirits* vigorous, and irritateth them, whereby they Incorporate the Parts of the *Liquor* perfectly.

316 As for the *Maturation of Fruits*; It is wrought by the *Calling forth of the Spirits of the Body Outward*, and ſo *Spreading* them more *ſmoothly*: And likewiſe by *Digeſting*, in ſome degree, *the Groſſer Parts*; And this is Effected; by *Heat*; *Motion*; *Attraction*; And by a *Rudiment* of *Putrefaction*: For the Inception of *Putrefaction* hath in it a *Maturation*.

317 There were taken *Apples*, and laid in *Straw*; In *Hay*; In *Flower*; In *Chalke*; In *Lime*; Couered ouer with *Onions*; Couered ouer with *Crabs*; Cloſed vp in *Wax*; Shut in a *Box*, &c. There was alſo an *Apple* hanged vp in *Smoake*: Of all which the *Experiments* ſorted in this Manner.

318 After a Moneths Space, the *Apple* Encloſed in *Wax*, was as Greene and Freſh as at the firſt putting in, and the *Kernels* continued White. The *Cauſe* is, for that all *Excluſion* of *Open Aire* (which is euer Predatory) maintaineth the Body in his firſt freſhneſſe, and Moiſture: But the Inconuenience

conuenience is, that it taſteth a little of the *Wax*: Which I ſuppoſe, in a *Pomgranate*, or ſome ſuch thicke-coated *Fruit*, it would not doe.

319 The *Apple* Hanged in the *Smoake*, turned like an Old Mellow *Apple*, Wrinkled, Dry, Soft, Sweet, Yellow within. The *Cauſe* is, for that ſuch a degree of *Heat*, which doth neither Melt, nor Scorch, (For wee ſee that in a great *Heat*, a *Roaſt Apple*, Softneth and Melteth; And *Pigs feet*, made of Quarters of *Wardens*, ſcorch and haue a Skin of Cole) doth Mellow, and not Adure: The *Smoake* alſo maketh the *Apple* (as it were) ſprinkled with *Soot*, which helpeth to *Mature*. We ſee that in *Drying* of *Peares*, and *Prunes*, in the Ouen, and Remouing of them often as they begin to Sweat, there is a like Operation; But that is with a farre more Intenſe degree of *Heat*.

320 The *Apples* couered in the *Lime* and *Aſhes*, were well *Matured*; As appeared both in their Yellowneſſe and Sweetneſſe. The *Cauſe* is, for that that *Degree of Heat* which is in *Lime*, and *Aſhes* (being a Smoothering *Heat*) is of all the reſt moſt Proper; for it doth neither Liquefie, nor Arefie; And that is true *Maturation*. Note that the taſte of thoſe *Apples* was good; And therefore it is the *Experiment* fitteſt for Vſe.

321 The *Apples*, *Couered* with *Crabs*, and *Onions*, were likewiſe well *Matured*. The Cauſe is, not any *Heat*; But for that the *Crabs* and the *Onions* draw forth the *Spirits* of the *Apple*, and ſpread them equally thorowout the *Body*; which taketh away Hardneſſe. So wee ſee one *Apple* ripeneth againſt another. And therefore in making of *Cider*, they turne the *Apples* firſt vpon a heape. So one *Cluſter* of *Grapes*, that toucheth another whileſt it groweth, ripeneth faſter; *Botrus contra Botrum citiùs matureſcit.*

322 The *Apples* in *Hay*, and the *Straw*, ripened apparantly, though not ſo much as the Other; But the *Apple* in the *Straw* more. The *Cauſe* is, for that the *Hay* and *Straw* haue a very low degree of *Heat*, but yet Cloſe and Smoothering, and which drieth not.

323 The *Apple* in the *Cloſe Box*, was ripened alſo: The *Cauſe* is, for that all Aire, kept cloſe, hath a degree of *Warmth*: As wee ſee in *Wooll*, *Furre*, *Pluſh*, &c.

Note that all theſe were Compared with another Apple, *of the ſame kinde, that lay of it ſelfe: And in Compariſon of that, were more Sweet, and more Yellow; and ſo appeared to be more Ripe.*

324 Take an *Apple*, or *Peare*, or other like *Fruit*, and *Rowle* it vpon a Table hard: Wee ſee in Common Experience, that the *Rowling* doth Soften and Sweeten the *Fruit* preſently; Which is Nothing but the *Smooth Diſtribution* of the *Spirits* into the Parts: For the *Vnequall Diſtribution* of the *Spirits* maketh the Harriſhneſſe: But this Hard *Rowling* is betweene *Concoction*, and a *Simple Maturation*; Therefore, if you ſhould *Rowle* them but gently, perhaps twice a day; And continue it ſome ſeuen dayes, it is like they would *Mature* more finely, and like vnto the *Naturall Maturation*.

325 Take an *Apple*, and cut out a Peece of the Top, and couer it, to ſee whether that *Solution of Continuity* will not haſten a *Maturation*; We ſee

that where a *Waspe*, or a *Flie*, or a *Worme* hath bitten, in a *Grape* or any *Fruit*, if it will sweeten hastily.

326 Take an *Apple*, &c. and pricke it with a *Pin* full of *Holes*, not deepe, and smeare it a little with *Sacke*, or *Cinnamon water*, or *Spirit of wine*, euery day for ten dayes, to see if the *Virtuall Heat* of the *Wine*, or *Strong Waters*, will not *Mature it*.

In these Trialls *also, as was vsed in the first, set another of the same* Fruits *by, to Compare them; And try them: by their* Yellownesse, *and by their* Sweetnesse.

Experiment Solitary touching the *Making of Gold*.

The World hath beene much abused by the Opinion of *Making of Gold*: The *Worke* it selfe I Iudge to bee possible; But the *Meanes* (hitherto propounded) to effect it, are, in the Practice, full of Errour and Imposture, And in the Theory, full of vnsound Imaginations. For to say, that *Nature* hath an Intention to make all Metals *Gold*. And that, if she were deliuered from Impediments, shee would performe her owne Worke; And that, if the Crudities, Impurities, and Leprosities of *Metalls* were cured, they would become *Gold*; And that a little *Quantity* of the *Medicine*, in the Worke of *Proiection*, will turne a Sea of the *Baser Metall* into *Gold*, by *Multiplying*: All these are but dreames: And so are many other Grounds of *Alchymy*. And to helpe the Matter, the *Alchymists* call in likewise many Vanities, out of *Astrology*; *Naturall Magicke*; Superstitious Interpretations of *Scriptures*; Auricular *Traditions*; Faigned Testimonies of *Ancient Authors*; And the like. It is true, on the other side, they haue brought to light not a few profitable *Experiments*, and thereby made the world some amends. But wee, when wee shall come to handle the *Version* and *Transmutation* of *Bodies*; And the *Experiments* concerning *Metalls*, and *Mineralls*; will lay open the true Wayes and Passages of *Nature*, which may leade to this great Effect. And wee commend the wit of the *Chineses*, who despaire of Making of *Gold*, but are Mad vpon the Making of *Siluer*: For certaine it is, that it is more difficult to make *Gold*, (which is the most Ponderous, and Materiate amongst *Metalls*) of other *Metalls*, lesse Ponderous, and lesse Materiate; than (*viâ versâ*) to make *Siluer* of *Lead*. or *Quick-Siluer*; Both which are more Ponderous than *Siluer*, So that they need

need rather a further Degree of *Fixation*, than any *Condenſation*. In the meane time, by Occaſion of Handling the *Axiomes* touching *Maturation*, we will direct a *Triall* touching the *Maturing* of *Metalls*, and thereby Turning ſome of them into *Gold*: For wee conceiue indeed, that a perfect good *Concoction*, or *Diſgeſtion*, or *Maturation* of ſome *Metalls*, will produce *Gold*. And here we call to minde, that we knew a *Dutch-man*, that had wrought himſelfe into the beleefe of a great Perſon, by vndertaking that hee could make *Gold*: whoſe diſcourſe was, that *Gold* might be made; But that the *Alchymiſts* Ouer-fired the Worke: For (he ſaid) the *Making* of *Gold* did require a very temperate *Heat*, as being in *Nature* a Subterrany worke, where little *Heat* commeth; But yet more to the *Making* of *Gold*, than of any other *Metall*; And therefore that hee would doe it with a great Lampe, that ſhould carry a Temperate and Equall Heat: And that it was the Worke of many Moneths. The Deuice of the Lampe was folly; But the Ouer-firing now vſed; And the Equall Heat to bee required; And the Making it a Worke of ſome good Time; are no ill Diſcourſes.

Wee reſort therefore to our *Axiomes* of *Maturation*, in Effect touched before. The Firſt is, that there be *vſed a Temperate Heat*; For they are euer *Temperate Heats* that *Diſgeſt*, and *Nature*: Wherein wee meane *Temperate*, according to the *Nature* of the *Subiect*; For that may bee *Temperate* to *Fruits*, and *Liquors*, which will not worke at all vpon *Metalls*. The Second is, that the *Spirits of the Metall bee quickened*, and the *Tangible Parts opened*: For without thoſe two Operations, the *Spirit* of the *Metall*, wrought vpon, will not bee able to diſgeſt the Parts. The Third is, that the *Spirits doe ſpread themſelues Euen*, and *moue not Subſultorily*; For that will make the Parts Cloſe and, Pliant. And this requireth a Heat, that doth not riſe and fall, but continue as *Equall* as may bee. The Fourth is, that *no Part of the Spirit be emitted, but detained*: For if there be *Emiſsion* of *Spirit*, the Bodie of the *Metall* will bee Hard, and Churliſh. And this will bee performed, partly by the Temper of the fire; And partly by the cloſeneſſe of the Veſſell. The

Fifth

Fifth is, that there bee *Choyce made of the likeliest and best Prepared Metall, for the Version*: For that will facilitate the worke. The Sixth is, that you giue *Time enough for the Worke*: Not to prolong Hopes (as the Alchymists doe;) but indeed to giue *Nature* a conuenient Space to worke in. These Principles are most certaine, and true; we will now deriue a direction of *Trial* out of them; which may (perhaps) by further Meditation, bee improued.

327 Let there be a *Small Furnace* made, of a *Temperate Heat*; Let the *Heat* bee such, as may keepe the *Metall perpetually Moulten*, and no more; For that aboue all importeth to the Worke. For the Materiall, take *Siluer*, which is the *Metall* that in Nature Symbolizeth most with *Gold*; Put in also, with the *Siluer*, a Tenth Part of *Quick-siluer*, and a Twelfth Part of *Nitre*, by weight; Both these to quicken and open the Body of the *Metall*; And so let the Worke bee continued by the *Space of Six Moneths*, at the least. I wish also, that there be, at some times, an Iniection of some *Oyled* Substance; Such as they vse in the Recouering of *Gold*: which by Vexing with Separations hath beene made Churlish: And this is to lay the Parts more Close and Smooth, which is the Maine Worke. For *Gold* (as wee see) is the Closest (and therefore the Heauiest) of *Metalls*: And is likewise the most Flexible, and Tensible. Note, that to thinke to make *Gold* of *Quick-siluer*, because it is the heauiest, is a Thing not to bee hoped; For *Quick-siluer* will not endure the Mannage of the *Fire*. Next to *Siluer*, I thinke *Copper* were fittest to be the *Materiall*.

Experiment Solitary touching the *Nature of Gold*.

328 *Gold* hath these *Natures*; *Greatnesse of Weight*; *Closeness of Parts*; *Fixation*; *Pliantnesse*, or *Softnesse*; *Immunity from Rust*; *Colour*, or *Tincture of Yellow*. Therefore the Sure Way, (though most about,) to make *Gold*, is to know the *Causes* of the Seuerall *Natures* before rehearsed, and the *Axiomes* concerning the same. For if a Man can make a *Metall*, that hath all these *Properties*, Let Men dispute, whether it be *Gold* or no?

Experiments in Consort touching the *Enducing* and *Accelerating* of *Putrefaction*.

The *Enducing* and *Accelerating* of *Putrefaction*, is a Subiect of a very Vniuersall Enquiry: For *Corruption* is a Reciprocall to *Generation*: And they Two, are as *Natures* two *Termes* or *Bundaries*; And the *Guides* to *Life* and *Death*. *Putrefaction* is the worke of the *Spirits* of *Bodies*, which euer are Vnquiet to *Get forth*, and *Congregate* with the *Aire*, and to enioy the *Sunbeames*: The *Getting forth*, or Spreading of the *Spirits*, (which is a Degree of *Getting forth*,) hath fiue Differing *Operations*. If the

the *Spirits* be detained within the Body, and moue more violently, there followeth *Colliquation*; As in *Metalls*, &c. If more Mildly, there followeth *Digestion*, or *Maturation*; As in *Drinkes*, and *Fruits*. If the *Spirits* bee not meerely Detained, but Protrude a little, and that Motion be Confused, and Inordinate, there followeth *Putrefaction*; Which euer dissolueth the Consistence of the Body into much Inequality; As in *Flesh*, *Rotten Fruits*, *Shining Wood*, &c. And also in the *Rust* of *Metals*. But if that Motion be in a certaine Order, there followeth *Viuification*, and *Figuration*; As both in *Liuing Creatures* bred of *Putrefaction*, and in *Liuing Creatures Perfect*. But if the *Spirits* issue out of the Body, there followeth *Deficcation*, *Induration Consumption*, &c. As in *Bricke*, Euaporation of *Bodies Liquid*, &c.

329 The *Meanes* to *Enduce* and *Accelerate Putrefaction*, are; First by *Adding some Crude or Watry Moisture*; As in Wetting of any Flesh, Fruit, Wood, with *Water*, &c. For contrariwise *Vnctuous* and *Oily Substances* preserue.

330 The Second is by *Imitation or Excitation*; As when a *Rotten Apple* lyeth close to another *Apple*, that is *Sound*: Or when *Dung* (which is a Substance already Putrified) is added to other Bodies. And this is also notably seene in *Church-yards*, where they bury much; Where the Earth will consume the *Corps*, in farre shorter time, than other Earth will.

331 The Third is, by *Closeness*, and *Stopping*, which *detaineth* the *Spirits*, *in Prison*, more than they would; And thereby irritateth them to seeke Issue; As in Corne, and Cloaths, which wax Musty; and therefore Open Aire (which they call *Aer perflabilis*) doth preserue: and this doth appeare more Euidently in *Agues*, which come (most of them,) of *Obstructions*, and *Penning* the *Humours*; which there upon *Putrifie*.

332 The Fourth is, by *Solution of Continuity*; As we see an Apple will rot sooner, if it be Cut or Pierced; And so will Wood, &c. And so the Flesh of Creatures alive, where they haue receiued any Wound.

333 The Fifth is, either by the *Exhaling*, or by the *Driuing backe* of the *principall Spirits*, which preserue the Consistence of the *Body*; So that when their Gouernment is Dissolued, euery *Part* returneth to his Nature, or Homogeny. And this appeareth in *Vrine*, and *Bloud*, when they coole, and thereby breake; It appeareth also in the *Gangrene*, or *Mortification* of *Flesh*, either by *Opiates*, or by *Intense Colds*. I conceiue also the same Effect is in *Pestilences*, for that the *Malignitie* of the *Infecting Vapour*, daunteth the *Principall Spirits*, and maketh them fly, and leaue their *Regiment*; And then the *Humours*, *Flesh*, and *Secondary Spirits*, doe dissolue and breake, as in an *Anarchy*.

The

334 The Sixth is, when a *Forraine Spirit, Stronger and more Eager than the Spirit of the Body, entreth the Body*; As in the Stinging of Serpents. And this is the *Cauſe* (generally) that vpon all *Poyſons* followeth *Swelling*: And we ſee *Swelling* followeth alſo, when the *Spirits* of the *Body* it ſelfe, Congregate too much; As vpon *Blowes*, and *Bruiſes*; Or when they are *Pent in too much*, as in *Swelling* vpon *Cold*. And we ſee alſo, that the *Spirits* comming of *Putrefaction* of *Humours* in *Agues*, &c, which may be counted as *Forraine Spirits*, though they be bred within the Body, do Extinguiſh and Suffocate the *Naturall Spirits*, and *Heat*.

335 The Seuenth is, by ſuch a *weake Degree of Heat, as ſetteth the Spirits in a little Motion, but is not able, either to diſgeſt the Parts, or to Iſſue the Spirits*; As is ſeen in Fleſh kept in a Roome that is not Coole: Whereas in a Coole and Wet Larder it will keepe longer. And we ſee, that *Vinification* (whereof *Putrefaction* is the *Baſtard Brother*,) is effected by ſuch Soft Heats; As the Hatching of Egges; The Heat of the Wombe, &c.

336 The Eighth is, by the *Releaſing of the Spirits*; which before were cloſe kept by the Solidneſſe of their Couerture, and thereby their Appetite of Iſſuing checked; As in the *Artificiall Ruſts* induced by ſtrong Waters, in *Iron*, *Lead*, &c. And therefore *Wetting* haſteneth *Ruſt*, *or Putrefaction* of any thing, becauſe it ſofteneth the Cruſt, for the *Spirits* to come forth.

337 The Ninth is, by the *Enterchange of Heat and Cold*, or *Wet and drie*; As wee ſee in the Mouldring of Earth in Froſts, and Sunne; And in the more haſtie Rotting of Wood, that is ſometimes wet, ſometimes drie.

338 The tenth is, by *Time, and the Worke and Procedure of the Spirits themſelues*, which cannot keepe their Station; Eſpecially if they be left to themſelues, And there be not Agitation or Locall Motion. As wee ſee in Corne not ſtirred; And mens Bodies not exerciſed.

339 All *Moulds* are Inceptions of *Putrefaction*; As the *Moulds* of *Pyes*, and *Fleſh*; the *Moulds* of *Orenges*, and *Limons*; which *Moulds* afterwards turne into Wormes, or more odious *Putrefactions*: And therefore (commonly,) prone to be of ill Odour. And if the Body be Liquid, and not apt to Putrifie totally; it will caſt vp a *Mother* in the Top; As the *Mothers* of *Diſtilled Waters*.

340 *Moſſe* is a Kind of *Mould*, of the Earth, and Trees. But it may be better ſorted as a *Rudiment* of *Germination*; To which we referre it.

Experiments in Conſort touching *Prohibiting* and *Preuenting Putrefaction*.

It is an *Enquiry* of Excellent vſe, to Enquire of the *Meanes* of *Preuenting* or *Staying Putrefaction*; For therein conſiſteth the *Meanes* of *Conſeruation* of *Bodies*; For *Bodies* haue two Kindes of *Diſſolutions*; The one by *Conſumption*, and *Deficcation*; The other by *Putrefaction*. But as for the *Putrefactions* of

of the *Bodies* of *Men*, and *Liuing Creatures*, (as in Agues, Wormes, Conſumptions of the Lungs, Impoſtumes, and Vlcers both Inwards and Outwards,) they are a great *Part of Phyſicke*, and *Surgery*: And therefore wee will reſerue the *Enquiry* of them to the proper Place, where wee ſhall handle *Medicinall Experiments* of all Sorts. Of the reſt we will now Enter into an Enquiry: wherein much light may be taken from that which hath beene ſaid, of the *Meanes* to *Enduce* or *Accelerate Putrefaction*: For the Remouing that, which cauſed *Putrefaction*, doth Preuent and Auoid *Putrefaction*.

The firſt *Meanes* of *Prohibiting* or *Checking Putrefaction*, is *Cold*: For ſo we ſee that Meat and Drinke will laſt longer, Vnputrified, or Vnſowred, in Winter, than in Summer: And wee ſee that Flowers, and Fruits, put in Conſeruatories of Snow, keepe freſh. And this worketh by the *Detention* of the *Spirits*, and *Conſtipation* of the *Tangible Parts*. 341

The ſecond is *Aſtriction*: For *Aſtriction* prohibiteth *Diſſolution*: As we ſee (generally) in *Medicines*, whereof ſuch as are *Aſtringents* doe inhibite *Putrefaction*: And by the ſame reaſon of *Aſtringency*, ſome ſmall Quantity of Oile of Vitriol, will keepe freſh Water long from *Putrefying*. And this *Aſtriction* is in a Subſtance that hath a *Virtuall Cold*; And it worketh (partly) by the ſame Meanes that Cold doth. 342

The Third is, the Excluding of the *Aire*; And againe, the *Expoſing to the Aire*: For theſe Contraries, (as it commeth often to paſſe,) worke the ſame Effect, according to the Nature of the Subiect Matter. So we ſee, that *Beere*, or *Wine*, in Bottles cloſe ſtopped, laſt long; That the *Garners vnder Ground* keepe Corne longer than thoſe aboue Ground; And that *Fruit cloſed in Wax* keepeth freſh: And likewiſe *Bodies* put in *Honey*, and *Flower*, keepe more freſh: And *Liquors*, *Drinkes*, and *Iuyces*, with a little *Oyle* caſt on the Top, keepe freſh. Contrariwiſe, we ſee that *Cloth* and *Apparell*, not *Aired* doe breed Moathes, and Mould; and the Diuerſity is, that in *Bodies* that need *Detention* of *Spirits*, the *Excluſion of the Aire* doth good; As in *Drinkes*, and *Corne*: But in *Bodies* that need *Emiſſion* of *Spirits*, to diſcharge ſome of the Superfluous Moiſture, it doth hurt, for they require *Airing*. 343

The Fourth is *Motion*, and *Stirring*; For *Putrefaction* asketh *Reſt*; For the Subtill *Motion*, which *Putrefaction* requireth, is diſturbed by any *Agitation*; And all *Locall Motion* keepeth *Bodies* Integrall, and their Parts together; As wee ſee that Turning ouer of Corne in a Garner; Or Letting it runne like an Houre-glaſſe, from an vpper Roome into a Lower, doth keepe it Sweet: And Running Waters putrefie not: And in Mens Bodies, Exerciſe hindereth *Putrefaction*; And contrariwiſe *Reſt*, and want of *Motion*, or Stoppings, (whereby the Runne of Humours, or the Motion of Perſpiration, is ſtaied,) further *Putrefaction*; As wee partly touched a little before. 344

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345 The Fifth is, the *Breathing forth of the Aduentitious Moisture in Bodies*; For as *Wetting* doth hasten *Putrefaction*; So *Conuenient Drying*, (whereby the more *Radicall Moisture* is onely kept in,) putteth backe *Putrefaction*: So we see that *Herbs*, and *Flowers*, if they be dried in the Shade; Or dried in the hot Sunne, for a small time keepe best. For the *Emission* or the *Loose* and *Aduentitious Moisture*, doth betray the *Radicall Moisture*; And carrieth it out for Company.

346 The Sixth is, the *Strengthening of the Spirits of Bodies*; For as a *Great Heat* keepeth Bodies from *Putrefaction*; But a *Tepide Heat* enclineth them to *Putrefaction*: So a Strong *Spirit* likewise preserueth, and a Weake or Faint *Spirit* disposeth to *Corruption*. So wee finde that Salt water corrupteth not so soone as Fresh: And Salting of Oisters, and Powdring of Meat, keepeth them from *Putrefaction*. It would bee tried also, whether *Chalke* put into *Water*, or *Drinke*, doth not preserue it from *Putrefying*, or speedy Souring. So we see that *Strong Beere* will last longer than small; And all Things, that are hot and Aromaticall, doe helpe to preserue Liquors, or Powders, &c. Which they doe, as well by Strengthning the *Spirits*, as by Soaking out the loose *Moisture*.

347 The Seuenth is, *Separation of the Cruder Parts*, and thereby making *the Body more Equall*; for all vnperfect Mixture is apt to *Putrefie*; And Watry Substances are more apt to *Putrefie*, than Oyly. So wee see distilled Waters will last longer than Raw Waters; And things that haue passed the Fire, doe last longer, than those that haue not passed the Fire; As Dried Peares, &c.

348 The Eighth is, the *Drawing forth continually of that Part, where the Putrefaction beginneth*; Which is (commonly) the *Loose and Watry Moisture*; Not only for the Reason before giuen, that it prouoketh the *Radicall Moisture* to come forth with it; But because being detained in the Body, the *Putrefaction* taking hold of it, infecteth the rest: As we see in the *Embalming dead Bodies*: And the same Reason is of *Preseruing Herbs*, or *Fruits*, or *Flowers*, in *Bran*, or *Meale*.

349 The Ninth is, the *Commixture of any Thing that is more Oily*, or *Sweet*: For such *Bodies* are least apt to *Putrefie*, the *Aire* working little vpon them: And they not putrefying preserue the rest. And therefore wee see *Syrups*, and *Ointments*, will last longer, than *Iuyces*.

350 The Tenth is, the *Commixture of somewhat that is Dry*; For *Putrefaction* beginneth first from the *Spirits*; And then from the *Moisture*: And that that is drie is vnapt to putrefie: And therefore Smoake preserueth Flesh; As wee see in Bacon, and Neats-Tongues, and Martlemas Beefe, &c.

351 The Opinion of some of the *Ancients*, that *Blowne Aires* doe preserue Bodies, longer than other *Aires*, seemeth to Mee Probable; For that the *Blowne Aires*, being Ouer-charged and Compressed, will hardly receiue the Exhaling of any Thing, but rather repulse it. It was tried in a *Blowne Bladder*, whereinto Flesh was put, and likewise a Flower, and it sorted not: For *Dry Bladders* will not *Blow*: And *New Bladders* rather

ther further *Putrefaction*: The way were therefore, to blow ſtrongly, with a Paire of Bellowes, into a Hogſhead, putting into the Hogſhead (before) that which you would haue preſerued; And in the inſtant that you withdraw the Bellowes, ſtop the Hole cloſe.

Experiment Solitary touching *Wood Shining* in the *Darke*. 352

THe *Experiment* of *Wood* that *Shineth* in the *Darke*, we haue diligently driuen, and purſued: The rather, for that of all Things, that giue Light here below, it is the moſt durable; And hath leaſt Apparent Motion. *Fire* and *Flame* are in continuall Expence; *Sugar* ſhineth onely while it is in Scraping; And *Salt-water* while it is in Waſhing; *Glow-wormes* haue their Shining while they liue, or a little after. Onely *Scales* of *Fiſhes* (Putrified) ſeeme to bee of the ſame Nature with *Shining Wood*: And it is true, that all *Putrefaction* hath with it an Inward Motion, as well as *Fire*, or *Light*. The *Triall* ſorted thus. 1. The *Shining* is in ſome Peeces more *Bright*; in ſome more *Dimme*; but the moſt *Bright* of all doth not attaine to the Light of a *Glow-worme*. 2. The *Woods* that haue beene tried to ſhine, are chiefly *Sallow* and *Willow*; Alſo the *Aſh*, and *Haſle*; It may bee, it holdeth in others. 3. Both *Roots*, and *Bodies* doe ſhine, but the *Roots* better. 4. The *Colour* of the *Shining Part*, by Day-light, is in ſome Peeces *White*, in ſome Peeces inclining to *Red*; Which in the Countrey they call the *White*, and *Red Garret*. 5. The Part that Shineth, is, (for the moſt part) ſomewhat *Soft*, and *Moiſt* to feele to; But ſome was found to bee *Firme*, and *Hard*; So as it might bee figured into a Croſſe, or into Beads, &c. But you muſt not looke to haue an Image, or the like, in any thing that is Lightſome; For euen a face in Iron red Hot will not bee ſeene, the Light confounding the ſmall differences of Lightſome and Darkſome, which ſhew the figure. 6. There was the *Shining Part pared off*, till you came to that, that did not Shine; But within two Dayes the *Part Contiguous* beganne alſo to *Shine*, being laid abroad in the Dew; So as it ſeemeth the Putrefaction ſpreadeth. 7. There was other dead wood of like kinde, that was *laid abroad*, which *Shined* not at the firſt; but after a Nights lying abroad began to *Shine*. 8. There was other *Wood*, that did *Firſt ſhine*: And being laid dry in the Houſe, within fiue or ſix dayes, *Loſt* the *ſhining*; And laid abroad againe, *Recouered* the *Shining*. 9. *Shining Woods*, being laid in a *Dry Roome*, within a Seuen night, loſt their Shining; But being laid in a *Cellar*, or *Danke Roome*, kept the *Shining*. 10. The *Boaring of Holes*, in that kinde of Wood, and then laying it abroad, ſeemeth to conduce to make it *Shine*: The *Cauſe* is, for that all *Solution* of *Continuity* doth helpe on *Putrifaction*, as was touched before. 11. No *Wood* hath beene yet tried to *Shine*, that was cut *downe aliue*, but ſuch as was *Rotted*, both in Stocke, and Root, while it grew. 12. Part of the *Wood* that *Shined*, was *ſteeped in Oyle*, and retained the *Shining* a Forthnight. 13. The like ſucceeded in ſome *Steeped* in *Water*, and much better. 14. How long the *Shining* will continue, if the *Wood* bee *laid abroad euery Night*, and *taken in* and *Sprinkled* with *water* in the *Day*, is not yet tried. 15. Triall was

made of *laying it abroad in Froſty weather*, which hurt it not. 16. There was a great *Peece* of a *Root* which did ſhine, and the *Shining Part* was *Cut off*, till no more Shined; Yet after two Nights, though it were kept in a dry Roome, it got a *Shining*.

Experiment Solitary touching the *Acceleration of Birth*. 353

THe *Bringing forth* of *Liuing Creatures* may bee *accelerated* in two Reſpects: The one, if the *Embryon ripeneth* and perfecteth ſooner: The other if there be ſome Cauſe from the *Mothers Body*, of *Expulſion* or Putting it downe: whereof the Former is good, and argueth ſtrength; The Latter is ill, and commeth by Accident or Diſeaſe. And therefore the Ancient *Obſeruation* is true, that the *Childe borne in the ſeuenth Moneth*, doth commonly well; But *Borne in the Eighth Moneth*, doth (for the moſt part) die. But the *Cauſe* aſſigned is Fabulous; Which is, that in the Eighth Moneth, ſhould bee the Returne of the Reigne, of the *Planet Saturne*: which (as they ſay) is a *Planet* Maligne; whereas in the Seuenth is the Reigne of the *Moone*, which is a Planet Propitious. But the true *Cauſe* is, for that where there is ſo great a Preuention of the Ordinary time, it is the *Luſtineſſe* of the *Childe*; But when it is leſſe, it is ſome *Indiſpoſition* of the *Mother*.

Experiment Solitary touching the *Acceleration* of *growth* and *Stature*. 354

TO *Accelerate Growth* or *Stature*, it muſt proceed; Either from the *Plenty* of the *Nouriſhment*; Or from the *Nature* of the *Nouriſhment*; Or from the *Quickening* and *Exciting* of the *Naturall Heat*. For the firſt, *Exceſſe* of *Nouriſhment* is hurtfull; For it maketh the Childe Corpulent; And Growing in Breadth, rather than in Heighth. And you may take an Experiment from *Plants*, which, if they ſpread much, are ſeldome tall. As for the *Nature* of the *Nouriſhment*; Firſt, it may not bee too *Dry*; And therefore Children in Dayry Countries doe wax more tall, than where they feed more vpon Bread, and Fleſh. There is alſo a receiued Tale; That Boyling of *Daſie Roots* in *Milke* (which it is certaine are great Driers) will make *Dogs* little. But ſo much is true, that an *Ouer-drie Nouriſhment* in Childhood putteth backe Stature. Secondly, the *Nouriſhment* muſt be of an *Opening Nature*; For that Attenuateth the Iuyce, and furthereth the Motion of the Spirits, vpwards. Neither is it without Cauſe, that *Xenophon*, in the *Nouriture* of the *Perſian Children*, doth ſo much commend their Feeding vpon *Cardamon*; which (hee ſaith) made them grow better, and bee of a more Actiue Habit. *Cardamon* is in Latine *Naſturtium*; And with vs *Water-Creſſes*; Which, it is certaine, is an Herbe, that whileſt it is young, is Friendly to Life. As for the *Quickning* of *Naturall Heat*, it muſt bee done chiefly with *Exerciſe*; And therefore (no doubt) much Going to Schoole, where they ſit ſo much, hindereth the *Growth* of *Children*; whereas Countrey People, that goe not to Schoole, are commonly of better Stature. And againe Men muſt beware, how they giue *Children*, any thing that is *Cold* in Operation; For euen *Long-Sucking* doth hinder both *Wit*, and *Stature*. This hath beene tried, that a Whelpe, that hath beene fed with *Nitre* in *Milke*, hath become

come very little, but extreme liuely: For the *Spirit* of *Nitre* is *Cold*. And though it be an Excellent Medicine, in Strength of yeares, for Prolongation of Life; yet it is, in Children and young Creatures, an Enemy to *Growth*: And all for the same Reason; For *Heat* is requisite to Growth: But after a Man is come to his Middle Age, *Heat* consumeth the Spirits; which the Coldnesse of the Spirit of *Nitre* doth helpe to condense, and correct.

Experiments in Consort, touching *Sulphur* and *Mercury*, two of *Paracelsus* Principles

There be two *Great Families* of *Things*: You may terme them by seuerall Names; *Sulphureous* and *Mercuriall*, which are the *Chymists* Words: (For as for their *Sal*, which is their Third Principle, it is a Compound of the other two;) *Inflammable* and *Not Inflammable*; *Mature* and *Crude*; *Oily* and *Watry*. For wee see that in *Subterranies* there are, as the *Fathers* of their *Tribes*, *Brimstone* and *Mercury*: In *Vegetables*, and *Liuing Creatures*, there is *Water* and *Oyle*: In the *Inferiour Order* of *Pneumaticalls* there is *Aire* and *Flame*: And in the *Superiour*, there is the *Body* of the *Starre*, and the *Pure Sky*. And these Paires, though they bee vnlike in the Primitiue Differences of Matter, yet they seeme to haue many Consents: For *Mercury* and *Sulphure* are principall Materialls of *Metalls*; *Water* and *Oyle* are principall Materials of *Vegetables* and *Animals*; And seeme to differ but in *Maturation*, or *Concoction*: *Flame* (in Vulgar Opinion) is but *Aire Incensed*; And they both haue Quickenesse of Motion, and Facility of Cession, much alike: And the *Interstellar Skie*, (though the Opinion be vaine, that the *Starre* is the *Denser Part* of his *Orbe*) hath notwithstanding so much Affinity with the *Starre*, that there is a Rotation of that, as well as of the *Starre*. Therefore, it is one of the greatest *Magnalia Naturæ*, to turne *Water*, or *Watry Iuyce*, into *Oyle* or *Oyly* Iuyce: Greater in Nature, than to turne *Siluer*, or *Quick-Siluer*, into *Gold*.

355 The Instances we haue, wherein *Crude* and *Watry* Substance turneth into *Fat* and *Oyly*, are of foure kinds. First in the *Mixture* of *Earth* and *Water*; which mingled by the helpe of the Sun, gather a Nitrous Fatnesse, more than either of them haue seuerally; As wee see, in that they put forth *Plants*, which need both Iuyces.

356 The Second is in the *Assimilation* of *Nourishment*, made in the *Bodies* of *Plants*, and *Liuing Creatures*; Whereof *Plants* turne the Iuyce of meere *Water* and *Earth*, into a great deale of *Oyly Matter*: *Liuing Creatures*,

tures, though much of their *Fat* and *Fleſh*, are out of *Oyly Aliments*, (as *Meat* and *Bread*) yet they Aſſimilate alſo in a Meaſure their *Drinke* of *Water*, &c. But theſe two Wayes of *Verſion* of *Water* into *Oyle*, (namely by *Mixture*, and by *Aſſimilation*) are by many Paſſages, and Percolations, and by long Continuance of ſoft *Heats*, and by Circuits of Time.

357 The third is in the *Inception* of *Putrefaction*; As in *Water Corrupted*; And the *Mothers* of *Waters Diſtilled*; Both which haue a kinde of *Fatneſſe* or *Oyle*.

358 The Fourth is in the *Dulcoration* of ſome *Metalls*; as *Saccharum Saturni*, &c.

359 The Intention of *Verſion* of *Water* into a more *Oily Subſtance*, is by *Diſgeſtion*; For *Oile* is almoſt Nothing elſe but *Water diſgeſted*; And this *Diſgeſtion* is principally by *Heat*; Which *Heat* muſt be either *Outward*, or *Inward*: Againe, it may be by Pronocation, or Excitation; Which is cauſed by the Mingling of Bodies already *Oily* or *Diſgeſted*; For they will ſomewhat Communicate their Nature with the reſt. *Diſgeſtion* alſo is ſtrongly effected by direct *Aſſimilation*, of *Bodies Crude* into *Bodies Diſgeſted*; As in *Plants*, and *Liuing Creatures*, whoſe Nouriſhment is far more Crude than their Bodies: But this *Diſgeſtion* is by a great Compaſſe, as hath beene ſaid. As for the more full handling of theſe two Principles, whereof this is but a Taſte; (the Enqury of which is one of the Profoundeſt Enquiries of Nature) Wee leaue it to the *Title* of *Verſion* of *Bodies*; And likewiſe to the *Title* of the *Firſt Congregations* of *Matter*; Which like a Generall Aſſemblie of Eſtates, doth giue Law to all *Bodies*.

Experiment Solitary touching *Chameleons*.

360 A *Chameleon* is a Creature about the Bigneſſe of an Ordinary *Lizard*: His Head vnproportionably big; His Eyes great: Hee moueth his Head without the writhing of his Necke (which is inflexible) as a *Hogge* doth: His Backe crooked; His Skin Spotted with little Tumours, leſſe Eminent nearer the Belly; his Taile ſlender, and long: On each Foot he hath fiue Fingers; three on the Outſide, and two on the Inſide; His Tongue of a Maruellous Length in reſpect of his Body, and hollow at the end; Which hee will launch out to prey vpon *Flies*. Of Colour Greene, and of a dusky Yellow, brighter and whiter towards the Belly; Yet ſpotted with Blew, White, and Red. If hee bee laid vpon Greene, the Greene predominateth; If vpon Yellow, the Yellow; not ſo if he be laid vpon Blew, or Red, or White; Onely the Greene Spots receiue a more Orient Luſtre: Laid vpon Blacke, hee looketh all Blacke, though not without a Mixture of Greene. Hee feedeth not onely vpon Aire (though that bee his principall Suſtenance;) For ſometimes hee taketh *Flies*, as was ſaid; Yet ſome that haue kept *Chameleons* a whole yeere together, could neuer perceiue that euer they fed vpon any Thing elſe but Aire; And might obſerue their Bellies to ſwell after they had exhauſted the Aire, and cloſed their Iawes; Which they open commonly

monly against the Rayes of the Sunne. They haue a foolish Tradition in *Magicke*, that if a *Chamelion* be burnt vpon the Top of a House, it will raise a Tempest; Supposing (according to their vaine Dreames of *Sympathies*) because he nourisheth with Aire, his Body should haue great vertue to make Impression vpon the Aire.

Experiment Solitary touching *Subterrany Fires*. 361

IT is reported by one of the *Ancients*, that in Part of *Media*, there are *Eruptions* of *Flames* out of *Plaines*; And that those *Flames* are cleere, and cast not forth such Smoake, and Ashes, and Pummice, as *Mountaine Flames* do. The Reason (no doubt) is, because the *Flame* is not pent, as it is in *Mountaines*, and *Earth-quakes* which cast *Flame*. There be also some *Blind Fires*, vnder *Stone*, which flame not out, but *Oile* being powred vpon them, they flame out. The Cause whereof is, for that it seemeth, the *Fire* is so choaked, as not able to remoue the Stone, it is *Heat*, rather than *Flame*; Which neuertheless is sufficient to Enflame the *Oile*.

Experiment Solitary touching *Nitre*. 362

IT is reported, that in some *Lakes*, the *Water* is so *Nitrous*, as if Foule Cloathes be put into it, it scoureth them of it selfe: And if they stay any whit long, they moulder away. And the Scouring Vertue of *Nitre* is the more to be noted, because it is a *Body Cold*; And wee see *warme Water* scoureth better than *Cold*. But the Cause is, for that it hath a Subtill Spirit, which seuereth and diuideth any thing that is foule, and Viscous, and sticketh vpon a Body.

Experiment Solitary touching *Congealing* of *Aire*. 363

TAke a *Bladder*, the greatest you can get; Fill it full of Wind, and tye it about the Necke with a silke thred waxed; And vpon that put likewise Wax very close; So that when the Necke of the *Bladder* drieth, no *Aire* may possibly get in, or out. Then bury it three or foure foot vnder the *Earth*, in a *Vault*, or in a *Conseruatory* of *Snow*, the *Snow* being made hollow about the *Bladder*; And after some Forthnights distance, see whether the *Bladder* be shrunke: For if it be, then it is plain that the *Coldnesse* of the *Earth*, or *Snow*, hath Condensed the *Aire*, and brought it a Degree nearer to *water*: Which is an *Experimenc* of great Consequence.

Experiment Solitary touching *Congealing* of *Water* into *Crystall*. 364

IT is a report of some good credit, that in *Deepe Caues*, there are *Pensile Crystall*, and *Degrees* of *Crystall* that drop from aboue; And in some other, (though more rarely) that rise from below. Which though it be chiefly the worke of Cold; yet it may bee, that Water, that passeth thorow the Earth, gathereth a Nature more clammy, and fitter to Congeale, and become Solid, than Water of it selfe. Therefore Triall would be made, to lay a Heape of Earth, in great Frosts, vpon a Hollow Vessell, putting a Canuase betweene, that it falleth not in. And powre Water vpon it, in such Quantity, as will be sure to soake thorow; And see whether it will not make an harder Ice in the bottome of the Vessel,

and lesse apt to dissolue, than ordinarily. I suppose also, that if you make the Earth narrower at the bottome, than at the Top, in fashion of a Sugar Loafe Reuersed, it will helpe the Experiment. For it will make the Ire, where it Issueth, lesse in bulke, and euermore Smalnesse of Quantity is a Helpe to *Version*.

Experiment Solitary touching *Preseruing* of *Roses* both in *Colour* & *Smell*. 365

TAke *Damaske Roses*, and pull them; Then drie them vpon the Top of an House, vpon a Lead or Tarras, in the hot Sunne, in a cleere day, betweene the Houres (onely) of twelue and two; or there abouts. Then put them into a Sweet *Dry Earthen Bottle*, or a *Glasse*, with narrow Mouthes, stuffing them close together, but without Bruising: Stop the *Bottle* or *Glasse* close, and these *Roses* will retaine, not onely there smell Perfect, but their Colour fresh, for a yeare at least. Note, that Nothing doth so much destroy any Plant, or other Body, either by *Putrefaction*, or *Arefaction*, as the *Aduentitious Moisture*, which hangeth loose in the Body, if it be not drawne out. For it betrayeth and tolleth forth the *Innate* and *Radicall Moisture*, along with it, when it selfe goeth forth. And therefore in *Liuing Creatures*, Moderate Sweat doth preserue the Iuice of the Body. Note that these *Roses*, when you take them from the *Drying*, haue little or no *Smell*, So that the Smell is a Second *Smell*, that issueth out of the *Flower* afterwards.

Experiments in Consort touching the *Continuance* of *Flame*. 366

THe *Continuance* of *Flame*, according vnto the diuersity of the *Body Enflamed*, & other Circumstances, is worthy the Enquiry; Chiefly, for that though *Flame* be (almost) of a Momentany Lasting, yet it receiueth the More, and the Lesse: we will first therefore speake (at large) of *Bodies Enflamed*, wholly, and immediatly, without any *Wicke* to helpe the *Inflammation*. A Spoonfull of *Spirit* of *Wine*, a little heated, was taken, and it burnt as long as came to 116 Pulses. The same Quantity of *Spirit* of *Wine*, Mixed with the Sixth Part of a Spoonfulll of *Nitre*, burnt but to the space of 94. Pulses. Mixed with the like Quantity of *Bay salt*, 83. Pulses. Mixed with the like Quantity of *Gunpowder*, which dissolued into a Blacke water, 110. Pulses. A Cube, or Pellet of *Yellow Wax*, was taken, as much as halfe the *Spirit* of *wine*, and set in the Middest, and it burnt onely to the space of 87. Pulses; Mixed with the Sixth Part of a spoonfull of *Milke*, it burnt to the space of 100. Pulses; And the *Milke* was crudled. Mixed with the Sixth Part of a spoonefull of *water*, it burnt to the space of 86. Pulses; With an *Equall Quantity* of *Water*, onely to the space of 4. Pulses. A Small *Pebble* was laid in the Middest; and the *Spirit* of *Wine* burnt to the space of 94. Pulses. A Peece of *Wood*, of the bignesse of an Arrow, and about a Fingers length, was set vp in the Middest, and the *Spirit* of *Wine* burnt to the space of 94. Pulses. So that the *Spirit* of *Wine Simple*, endured the longest; And the *Spirit* of *wine* with the *Bay-Salt*, and the *Equall Quantity* of *Water*, were the shortest.

367 Consider well, whether the more speedy *Going forth of the flame*, bee caused,

caused, by the *Greater Vigour* of the *Flame* in *Burning*; Or by the *Resistance* of the *Body mixed*, and the *Auersion* thereof to take *Flame*: Which will appeare by the Quantity of the *Spirit* of *Wine*, that remaineth after the Going out of the *Flame*. And it seemeth clearely to be the latter; For that the Mixture of Things least apt to burne, is the Speediest in going out. And note, by the way, that *Spirit* of *Wine* burned, till it goe out of it selfe, will burne no more, And tasteth nothing so hot in the Mouth, as it did; No nor yet sower, (as if it were a degree towards *Vineger*,) which *Burnt Wine doth*; but flat and dead.

Note, that in the *Experiment* of *Wax* aforesaid, the *Wax* dissolued in the burning, and yet did not incorporate it selfe, with the *Spirit* of *Wine*, to produce one *Flame*; but wheresoeuer the *Wax* floated, the *Flame* forsooke it, till at last it spread all ouer, and put the *Flame* quite out. 368

The *Experiments* of the *Mixtures* of the *Spirit* of *Wine enflamed*, are Things of Discouery, and not of Vse. But now wee will speake of the *Continuance* of *Flames*, such as are vsed for *Candles*, *Lampes*, or *Tapers*; consisting of *Inflammable Matters*, and of a *Wicke* that prouoketh *Inflamation*. And this importeth not only Discouery, but also Vse and Profit; For it is a great Sauing, in all such Lights, if they can be made as faire and bright as others, and yet last longer. *Wax Pure* made into a Candle, and *Wax Mixed* seuerally into Candle-stuffe, with the Particulars that follow, (viz. *Water*, *Aqua-vitæ*, *Milk*, *Bay-salt*, *Oyle*, *Butter*, *Nitre*, *Brimstone*, *Saw-dust*,) Euery of these bearing a Sixth Part to the *wax*; And euery of these *Candles mixed*, being of the same Weight and Wicke with the *Wax Pure*, proued thus in the Burning, and Lasting. The swiftest in Consuming was that with *Saw-dust*; Which first burned faire, till some part of the *Candle* was consumed, and the Dust gathered about the Snaste; But then it made the Snaste bigge, and long, and to burne duskishly, and the *Candle* wasted in halfe the time of the *Wax Pure*. The next in Swiftnesse, were the *Oile*, and *Butter*, which consumed, by a Fifth part, swifter than the *Pure Wax*. Then followed in Swiftnesse the *Cleare wax* it selfe. Then the *Bay-Salt*, which lasted about an Eighth Part longer than the *Cleare wax*. Then followed the *Aqua-vitæ*, which lasted about a Fifth part longer than the *Cleare wax*. Then followed the *Milk*, and *water*, with little difference from the *Aqua-vitæ*, but the *Water* slowest. And in these foure last, the *wicke* would spit forth little Sparkes. For the *Nitre*, it would not hold lighted aboue some Twelue Pulses; But all the while it would spit out Portions of *Flame*, which afterwards would goe out into a vapour. For the *Brimstone*, it would hold lighted, much about the same time with the *Nitre*; But then after a little while, it would harden and cake about the Snaste; So that the Mixture of *Bay-Salt* with *wax*, will win an Eighth part of the time of lasting, and the *water* a Fifth. 369

After the Seuerall *Materialls* were tried, Triall was likewise made of seuerall *Wickes*; As of Ordinary *Cotton*; *Sowing Thred*; *Rush*; *Silke*, *Straw*; and *Wood*. The *Silke*, *Straw*, and *Wood*, would flame a little, till 370

they

they came to the *Wax*, and then goe out: of the Other Three, the *Threed* consumed faster than the *Cotton*, by a Sixth part of Time: The *Cotton*, next: Then the *Rush* consumed slower than the *Cotton*, by at least a third part of time. For the Bigneſſe of the *Flame*, the *Cotton*, and *Thred*, caſt a *Flame* much alike; and the *Rush* much leſſe, and dimmer. *Quære*, whether *wood*, and *wickes* both, as in *Torches*, conſume faster, than the *Wickes Simple*.

371 We haue ſpoken of the Seuerall *Materialls*, and the Seuerall *Wickes*: But to the *laſting* of the *Flame*, it importeth alſo, Not only what the *Materiall* is, but in the ſame *Materiall*, whether it be Hard, Soft, Old, New, &c. Good *Houſewiues*, to make their *Candles* burne the longer, vſe to lay them (one by one) in *Bran*, or *Flower*, which make them harder, and ſo they Conſume the ſlower: In ſo much, as by this meanes, they will outlaſt other *Candles*, of the ſame Stuffe, almoſt Halfe in Halfe. For *Bran* and *Flower* haue a Vertue to Harden: So that both Age, and lying in the Bran, doth helpe to the Laſting. And we ſee that *Wax Candles* laſt longer than *Tallow Candles*, becauſe *wax* is more firme, and hard.

372 The *Laſting* of *Flame* alſo dependeth vpon the *eaſie Drawing* of the *Nouriſhment*; As we ſee in the *Court* of *England*, there is a Seruice which they call *All-night*; which is (as it were) a great Cake of Wax, with the Wicke in the Middeſt; whereby it commeth to paſſe, that the Wicke fetcheth the Nouriſhment further off. We ſee alſo that *Lamps* laſt longer, becauſe the Veſſell is farre broader, than the Bredth of a Taper, or Candle.

373 Take a *Turretted Lampe* of *Tinne*, made in the forme of a Squire; The Height of the *Turret* being thrice as much, as the length of the lower part whereupon the *Lampe* ſtandeth: Make only one Hole in it, at the End of the Returne furtheſt from the *Turret*. Reuerſe it, and fill it full of *Oile*, by that Hole; And then ſet it vpright againe; And put a Wicke in at the Hole; And lighten it: You ſhall finde that it will burne ſlow, and a long time. Which is cauſed, (as was ſaid laſt before,) for that the *Flame* fetcheth the *Nouriſhment afarre off*. You ſhall finde alſo, that as the *Oile* waſteth, and deſcendeth, ſo the Top of the *Turret*, by little and little, filleth with Aire; which is cauſed by the Rarefaction of the *Oile* by the Heat. It were worthy the Obſeruation, to make a Hole, in the Top of the *Turret*, and to trie, when the *Oile* is almoſt conſumed, whether the *Aire* made of the *Oile*, if you put to it a *Flame* of a *Candle*, in the letting of it forth, will Enflame. It were good alſo to haue the *Lampe* made, not of *Tinne*, but of *Glaſſe*, that you may ſee how the Vapour, or Aire gathereth, by degrees, in the Top.

374 A Fourth Point, that importeth the *laſting* of the *Flame*, is the *Cloſeneſſe* of the *Aire*, wherein the *Flame* burneth. We ſee, that if *Wind* bloweth vpon a *Candle*, it waſteth apace. We ſee alſo, it laſteth longer in a *Lanthorne*, than at *large*. And there are Traditions of *Lampes*, and *Candles*, that haue burnt a very long time, in *Caues*, and *Tombs*.

375 A fifth Point, that importeth the *Laſting* of the *Flame*, is the *Nature* of

of the *Aire*, where the *Flame* burneth; whether it bee Hot or Cold, Moist or Drie. The *Aire*, if it be very *Cold*, irritateth the *Flame*, and maketh it burne more fiercely; (As Fire scorcheth in Frosty weather;) And so furthereth the *Consumption*. The *Aire* once heated, (I conceiue) maketh the *Flame* burne more mildly, and so helpeth the *Continuance*. The *Aire*, if it be *Drie*, is indifferent: The *Aire*, if it be *Moist*, doth in a Degree quench the *Flame*: (As we see *Lights* will goe out in the *Damps* of *Mines*:) And howsoeuer maketh it burne more dully: And so helpeth the *Continuance*.

Burialls in *Earth* serue for *Preseruation*; And for *Condensation*; And for *Induration* of *Bodies*. And if you intend *Condensation*, or *Induration*, you may bury the *Bodies* so, as *Earth* may touch them: As if you will make *Artificiall Porcellane*, &c. And the like you may doe for *Conseruation*, if the *Bodies* be Hard and Solid; As Clay, Wood, &c. But if you intend *Preseruation* of *Bodies*, more Soft and Tender, then you must doe one of these two: Either you must put them in *Cases*, whereby they may not touch the *Earth*; Or else you must *vault the Earth*, whereby it may hang ouer them, and not touch them: For if the *Earth* touch them, it will doe more hurt, by the Moisture, causing them to putrifie, than good by the virtuall Cold, to conserue them; Except the *Earth* be very Drie, and Sandie. Experiments in Consort, touching *Burialls* or *Infusions* of diuers *Bodies* in *Earth*. 376

An *Orenge*, *Limon*, and *Apple*, wrapt in a Linnen Cloth, being buried for a Forthnights Space, foure foot deepe within the Earth, though it were in a Moist Place, and a Rainie Time, yet came forth, no waies Mouldie, or Rotten, but were become a little harder than they were; Otherwise fresh in their Colour; But their Iuyce somewhat flatted. But with the *Buriall* of a Forthnight more they became putrified. 377

A *Bottle* of *Beere*, *buried* in like manner, as before, became more liuely, better tasted, and Clearer, than it was. And a *Bottle* of *Wine* in like manner. A *Bottle* of *Vinegar*, so buried, came forth more liuely, and more Odoriferous, smelling almost like a Violet. And after the whole Moneths *Buriall*, all the Three came forth, as fresh and liuely, if not better, than before. 378

It were a profitable *Experiment*, to preserue *Orenges*, *Limons*, and *Pomoranates*, till Summer; For then their Price will bee mightily increased. This may be done, if you put them in a Pot or Vessell, well couered, that the *Moisture* of the *Earth* come not at them; Or else by putting them in a *Conseruatory* of *Snow*. And generally, whosoeuer will make *Experiments* of *Cold*, let him be prouided of three Things; A *Conseruatorie* of *Snow*; A good *large Vault*, twenty foot at least vnder the Ground; And a *Deepe Well*. 379

There hath beene a Tradition, that *Pearle*, and *Corall*, and *Turchois-Stone*, that haue lost their Colours, may be recouered by *Burying* in the *Earth*: Which is a thing of great profit, if it would sort: But vpon Triall of Six weekes *Buriall*, there followed no effect. It were good to trie it, in 380

in a *Deepe Well*; or in a *Conseruatory* of *Snow*, where the Cold may be more Constringent; And so make the *Body* more vnited, and thereby more Resplendent.

Experiment Solitary touching the *Affects* in *Mens Bodies* from *Seuerall Winds*. 381

Mens Bodies are heauier, and lesse disposed to Motion, when *Southerne Winds* blow, than when *Northerne*. The *Cause* is, for that when the *Southerne Winds* blow, the Humours doe (in some Degree) melt and wax fluide, and so flow into the Parts; As it is seene in *Wood*, and other *Bodies*; which, when the *Southerne winds* blow, doe swell. Besides, the Motion and Actiuity of the Body consisteth chiefly in the Sinewes, which, when the *Southerne Wind* bloweth, are more relax.

Experiment Solitary touching *Winter* and *Summer Sicknesses*. 382

IT is commonly seene, that more are *Sicke* in the *Summer*, and more *Dye* in the *Winter*; Except it be in *Pestilent Diseases*, which commonly reigne in *Summer*, or *Autumne*. The Reason is, because *Diseases* are bred (indeed) chiefely by *Heat*; But then they are Cured most by *Sweat*, and *Purge*; which in the *Summer* commeth on, or is prouoked, more Easily: As for *Pestilent Diseases*, the Reason why most Die of them in *Summer*, is because they are bred most in the *Summer*; For otherwise those that are touched are in most Danger in the *Winter*.

Experiment Solitary touching *Pestilentiall Seasons*. 383

THe Generall Opinion is, that *Yeares Hot* and *Moist*, are most *Pestilent*; Vpon the Superficiall Ground, that *Heat* and *Moisture* cause *Putrefaction*. In *England* it is found not true; For, many times, there haue beene great *Plagues* in *Drie Yeares*. Whereof the Cause may be, for that *Drought* in the Bodies of *Islanders*, habituate to *Moist Aires*, doth Exasperate the Humours, and maketh them more apt to Putrifie, or Enflame: Besides, it tainteth the *Waters* (commonly,) and maketh them lesse wholesome. And againe in *Barbary*, the *Plagues* breake vp in the *Summer-moneths*, when the *weather* is *Hot* and *Dry*.

Experiment Solitary touching an *Error receiued* about *Epidemicall Diseases*. 384

MAny *Diseases*, (both *Epidemicall*, and others,) breake forth at *Particular times*. And the *Cause* is falsly imputed to the *Constitution* of the *Aire*, at *that time*, when they *breake forth*, or *reigne*; whereas it proceedeth (indeed) from a *Precedent Sequence*, and *Series* of the *Seasons* of the *Yeare*: And therefore *Hippocrates*, in his *Prognosticks*, doth make good Obseruations, of the *Diseases*, that ensue vpon the *Nature*, of the *Precedent foure Seasons* of the *Yeare*.

Experiment Solitary touching the *Alteration* or *Preseruation* of *Liquors* in *Wells*, or *deepe Vaults*. 385

TRiall hath been made, with *Earthen Bottles* well stopped, hanged in a *well* of Twenty Fathome deep, at the least; And some of the *Bottles* haue beene let downe into the *Water*, some others haue hanged aboue, within about a fathome of the *water*, And the *Liquors* so tried haue beene, *Beere*, (not New, but Ready for drinking,) and *Wine*, and *Milke*. The Proofe hath beene, that both the *Beere*, and the *Wine*, (as well within *Water*, as aboue,) haue not been palled or deaded at all; But as

as good or somewhat better, than *Bottles* of the same *Drinkes*, and Staleness, kept in a *Cellar*. But those which did hang aboue *Water*, were apparently the best; And that *Beere* did flower a little; whereas that vnder *water* did not, though it were Fresh. The *Milke* sowred, and began to Putrefie. Neuertheless it is true, that there is a *Village* neere *Blois*, where in *Deepe Caues* they doe thicken *Milke*; In such sort that it becommeth very pleasant; Which was some *Cause* of this Triall of Hanging *Milke* in the *Well*: But our proofe was naught: Neither doe I know, whether that *Milke* in those *Caues*, bee first boyled. It were good therefore to try it with *Milke* Sodden, and with Creame; For that *Milke* of it selfe is such a Compound Body, of *Creame*, *Curds*, and *Whey*, as it is easily Turned, and Dissolued. It were good also to try the *Beere*, when it is in *Wort*, that it may be seene, whether the *Hanging* in the *Well*, will Accelerate the *Ripening* and *Clarifying* of it.

Experiment Solitary touching *Stutting*. 386

Diuers, we see, doe *Stut*. The *Cause* may be, (in most,) the *Refrigeration* of the *Tongue*; Whereby it is lesse apt to moue. And therefore wee see, that *Naturalls* doe generally *Stut*; And wee see that in those that *Stut*, if they drinke Wine moderately, they *Stut* lesse, because it heateth: And so wee see, that they that *Stut*, doe *Stut* more in the first Offer to speake, than in Continuance; Because the *Tongue* is, by Motion, somewhat heated. In some also, it may be, (though rarely,) the *Drinesse* of the *Tongue*; which likewise maketh it lesse apt to moue, as well as *Cold*; For it is an Affect that commeth to some *Wise* and *Great Men*; As it did vnto *Moses*, who was *Lingua prapedita*; And many *Stutters* (we finde) are very *Cholericke Men*; *Choler* Enducing a *Drinesse* in the *Tongue*.

Experiments in Consort, touching *Smells*. 387

Smells, and other *Odours*, are Sweeter in the Aire, at some Distance, than neere the Nose; As hath beene partly touched heretofore. The *Cause* is double; First the finer Mixture, or Incorporation of the *Smell*: For wee see that in *Sounds* likewise, they are Sweetest, when wee cannot heare euery Part by it selfe. The other *Reason* is, for that all *Sweet Smells* haue ioyned with them, some *Earthy* or *Crude Odours*; And at some distance the *Sweet*, which is the more Spirituall, is Perceiued; And the *Earthy* reacheth not so farre.

388

Sweet Smells are most forcible, in *Dry Substances*, when they are *Broken*; And so likewise in *Orenges*, or *Limons*, the Nipping of their Rinde, giueth out their *Smell* more: And generally, when *Bodies* are *Moued* or *Stirred*, though not *Broken*, they *Smell* more; As a Sweet-Bagge waued. The *Cause* is double: The one, for that there is a *Greater Emission* of the *Spirit*, when Way is made: And this holdeth in the *Breaking*, *Nipping*, or *Crushing*; It holdeth also, (in some Degree) in the Mouing; But in this last, there is a Concurrence of the Second *Cause*; Which is the *Impulsion* of the *Aire*, that bringeth the *Sent* faster vpon vs.

389

The daintiest *Smells* of *Flowers*, are out of those *Plants*, whose *Leaues smell* not; As *Violets*, *Roses*, *Wall-flowers*, *Gilly-flowers*, *Pinkes*, *Woodbines*, *Vine-*

Vine-flowers, Apple-Bloomes, Lime-Tree Bloomes, Beane-Bloomes, &c. The *Cauſe* is, for that where there is Heat and ſtrength enough in the *Plant*, to make the *Leaues Odorate*, there the *Smell* of the *Flower* is rather Euanide and Weaker, than that of the *Leaues*; As it is in *Roſe-mary-Flowers, Lauender-Flowers*, and *Sweet-Brier-Roſes*. But where there is leſſe Heat, there the *Spirit* of the *Plant* is diſgeſted and refined, and ſeuered from the groſſer Iuice, in the *Effloreſcenſe*, and not before.

390 Moſt *Odours* ſmell beſt, *Broken* or *Cruſht*, as hath beene ſaid: But *Flowers Preſſed* or *Beaten*, doe leeſe the Freſhneſſe and Sweetneſſe of their *Odour*. The *Cauſe* is, for that when they are *Gruſhed*, the Groſſer and more *Earthy Spirit* commeth out with the Finer, and troubleth it; Whereas in ſtronger *Odours* there are no ſuch Degrees of the Iſſue of the *Smell*.

Experiments in Conſort, touching the *Goodneſſe* and *choice* of *Water*.

IT is a thing of very good Vſe, to diſcouer the *Goodneſſe* of *Waters*. The *Taſte*, to thoſe that Drinke *Water* only, doth ſomewhat: But other *Experiments* are more ſure. Firſt, try *Waters* by *Weight*; Wherein you may find ſome difference, though not much: And the *Lighter* you may account the Better.

391 Secondly, try them by *Boyling* vpon an *Equall Fire*: And that which conſumeth away faſteſt, you may account the Beſt.

392

393 Thirdly, try them in *Seuerall Bottles*, or Open Veſſells, Matches in euery Thing elſe, and ſee which of them *Laſt Longeſt*, without *Stench* or *Corruption*. And that which holdeth Vnputrified longeſt, you may likewiſe account the Beſt.

394 Fourthly, try them by *Making Drinkes* Stronger, or Smaller, with the ſame *Quantity* of *Mault*; And you may conclude, that that *Water*, which maketh the *Stronger Drinke*, is the more Concocted, and Nouriſhing; though perhaps it bee not ſo good for *Medicinall Vſe*. And ſuch *Water* (commonly) is the *Water* of *Large* and *Nauigable Riuers*; And likewiſe in *Large* and *Cleane Ponds* of *Standing-Water*: For vpon both them, the Sunne hath more Power, than vpon Fountaines, or Small Riuers. And I conceiue that *Chalke-Water* is next them the beſt, for going furtheſt in *Drinke*; For that alſo helpeth *Concoction*; So it bee out of a *Deepe Well*; For then it Cureth the Rawneſſe of the *Water*; But *Chalky water*, towards the Top of the Earth, is too fretting; As it appeareth in Laundry of Cloathes, which weare out apace, if you vſe ſuch *Waters*.

395 Fifthly, The Houſwiues doe finde a Difference in *Waters*, for the *Bearing*, or *Not Bearing* of *Soape*; And it is likely that the more *Fat Water* will beare *Soape* beſt; For the *Hungry Water* doth kill the Vnctuous Nature of the *Soape*.

396 Sixthly, you may make a Iudgement of *Waters*, according to the *Place*, whence they Spring, or Come; The *Raine-Water* is, by the *Phyſitians*, eſteemed the Fineſt, and the beſt; But yet it is ſaid to putrifie ſooneſt; which is likely, becauſe of the Fineneſſe of the *Spirit*: And in *Conſeruatories*

ſeruatories of *Raine-water*, (ſuch as they haue in *Venice*, &c.) they are found not ſo Choice *Waters*; The worſe, (perhaps,) becauſe they are Couered aloft, and kept from the Sunne. *Snow water* is held vnwholeſome; In ſo much as the People, that dwell at the Foot of the *Snow-Mountaines*, or otherwiſe vpon the Aſcent (eſpecially the Women) by drinking of *Snow-water*, haue great Bags hanging vnder their Throats. *Well-water*, except it be vpon *Chalke*, or a very plentifull Spring, maketh Meat Red; which is an ill Signe. *Springs* on the *Tops* of *High-Hills* are the beſt; For both they ſeeme to haue a Lightneſſe, and Appetite of Mounting; And beſides they are moſt pure and Vnmingled; And againe are more Percolated thorow a great Space of Earth. For *Waters* in *Valleys*, ioyne in effect vnder ground with all *Waters* of the ſame Leuell; Whereas *Springs*, on the *Tops* of *Hills*, paſſe thorow a great deale of Pure *Earth*, with leſſe Mixture of other *Waters*.

Seuenthly, Iudgement may bee made of *Waters*, by the *Soyle where-upon the water runneth*; As *Pebble* is the Cleaneſt, and beſt taſted; And next to that *Clay water*; And Thirdly, *Water* vpon *Chalke*; Fourthly, that vpon *Sand*; And Worſt of all vpon *Mud*. Neither may you truſt *Waters* that *Taſte Sweet*; For they are commonly found in Riſing Grounds of great *Cities*; which muſt needs take in a great deale of Filth.

397

IN *Peru*, and diuers Parts of the *Weſt-Indies*, though vnder the *Line*; the *Heats* are not ſo Intolerable, as they bee in *Barbary*, and the Skirts of the *Torrid Zone*. The *Cauſes* are, Firſt the Great *Brizes*, which the Motion of the Aire in great Circles, (ſuch as are vnder the *Girdle* of the *World*,) produceth; Which doe refrigerate; And therefore in thoſe Parts Noone is nothing ſo hot, when the *Brizes* are great, as about Nine or Ten of the Clocke in the Fore-Noone. Another *Cauſe* is, for that the Length of the Night, and the Dewes thereof, doe compenſe the *Heat* of the Day. A third *Cauſe* is the Stay of the Sunne; Not in Reſpect of Day and Night, (for that wee ſpake of before,) but in Reſpect of the *Seaſon*; For vnder the *Line*, the Sunne croſſeth the *Line*, and maketh two Summers, and two Winters; But in the Skirts of the *Torrid Zone*, it doubleth and goeth backe againe, and ſo maketh one Long Summer.

Experiment Solitary touching the *Temperate Heat* vnder the *Æquinoctiall*.

398

THE *Heat* of the *Sunne* maketh *Men Blacke* in ſome Countries, as in *Æthiopia*, and *Ginny*, &c. *Fire* doth it not, as wee ſee in *Glaſſemen*, that are continually about the *Fire*. The *Reaſon* may bee, becauſe *Fire* doth licke vp the *Spirits*, and Bloud of the Body, ſo as they Exhale; So that it euer maketh *Men* looke Pale, and Sallow; But the *Sunne*, which is a Gentler Heat, doth but draw the Bloud to the Outward *Parts*: And rather Concocteth it, than Soaketh it: And therefore wee ſee that all *Æthiopes* are Fleſhy, and Plumpe, and haue great Lips; All which betoken *Moiſture* retained, and not drawne out. Wee ſee alſo, that the

Experiment Solitary touching the *Coloration* of *Blacke* and *Tawney Moores*.

399

Negroes are bred in Countries that haue Plenty of *Water*, by *Riuers* or otherwiſe: For *Meroë*, which was the *Metropolis* of *Æthiopia*, was vpon a great Lake: And *Congo*, where the *Negroes* are, is full of Riuers. And the Confines of the Riuer *Niger*, where the *Negroes* alſo are, are well watered: And the Region about *Capo Verde*, is likewiſe Moiſt, in ſo much as it is peſtilent through Moiſture: But the Countries of the *Abyſſenes*, and *Barbary*, and *Peru*, where they are Tawney, and Oliuaſter, and Pale, are generally more Sandy and Dry. As for the *Æthiopes*, as they are Plumpe, and Fleſhy; So (it may bee) they are Sanguine, and ruddy Coloured, if their blacke Skin would ſuffer it to be ſeene.

Experiment Solitary touching *Motion* after the *Inſtant* of *Death*. 400

SOme *Creatures* doe moue a good while after their head is off; As *Birds*; Some a very little time; As *Men*, and all beaſts: Some moue, though cut in ſeuerall Peeces; As *Snakes*, *Eeles*, *Wormes*, *Flies*, &c. Firſt therefore it is certaine, that the *Immediate Cauſe* of *Death*, is the Reſolution, or Extinguiſhment of the *Spirits*; And that the Deſtruction or Corruption of the *Organs*, is but the *Mediate Cauſe*. But ſome *Organs* are ſo peremptorily neceſſary, that the Extinguiſhment of the Spirits doth ſpeedily follow; But yet ſo, as there is an *Interim* of a ſmall Time. It is reported by one of the *Ancients*, of credit, that a *Sacrificed Beaſt* hath lowed, after the Heart hath beene ſeuered; And it is a report alſo of Credit, that the *Head* of a *Pig* hath beene opened, and the Braine put into the Palme of a Mans hand, trembling, without breaking any part of it, or ſeuering it from the Marrow of the Backe-bone; During which time the *Pig* hath beene, in all appearance, ſtarke dead, and without Motion; And after a ſmall time the Braine hath beene replaced, and the Skull of the *Pig* cloſed, and the *Pig* hath a little after gone about. And certaine it is, that an *Eye* vpon *Reuenge* hath beene thruſt forth, ſo as it hanged a pretty diſtance by the *Viſuall Nerue*; And during that time the *Eye* hath beene without any Power of *Sight*; And yet after (being replaced) recouered *Sight*. Now the *Spirits* are chiefly in the *Head* and *Cells* of the *Braine*, which in *Men*, and *Beaſts* are Large; And therefore when the *Head* is off, they moue little or Nothing. But *Birds* haue ſmall *Heads*, and therefore the *Spirits* are a little more diſperſed in the *Sinewes*, whereby Motion remaineth in them a little longer; In ſo much as it is Extant in Story, that an *Emperour* of *Rome*, to ſhew the Certainty of his Hand, did ſhoot a great Forked Arrow at an *Eſtrich*, as ſhe ranne ſwiftly vpon the Stage, and ſtrooke off her Head; And yet ſhe continued the Race, a little way, with the Head off. As for *Wormes*, and *Flies*, and *Eeles*, the *Spirits* are diffuſed almoſt all ouer; And therefore they moue in their Seuerall Peeces.

NATV-

NATVRALL HISTORIE.

V. Century.

WEE will now enquire of *Plants* or *Vegetables*: And wee shall doe it with diligence. They are the Principall Part of the *Third Dayes Worke*. They are the first *Producat*, which is the Word of *Animation*: For the other Words are but the Words of *Essence*; And they are of excellent and generall Vse, for Food, Medicine, and a Number of Mechanicall Arts.

Experiments in Consort, touching the *Acceleration* of *Germination*.

There was sowne in a *Bed*, *Turnip-Seed*, *Radish-Seed*, *Wheat*, *Cucumber-Seed*, and *Pease*. The *Bed* wee call a *Hot-Bed*, and the Manner of it is this. There was taken *Horse-Dung*, old, and well rotted; This was laid vpon a Banke, halfe a foot high, and supported round about with Plankes; And vpon the Top was cast Sifted Earth, some two Fingers deepe; And then the *Seed* sprinkled vpon it, having beene steeped all night in *Water*, Mixed with *Cow-dung*. The *Turnip-Seed*, and the *Wheat* came vp halfe an Inch aboue Ground, within two dayes after, without any Watring. The Rest the third day. The *Experiment* was made in *October*; And (it may bee) in the *Spring*, the *Accelerating* would haue beene the speedier. This is a Noble *Experiment*; For without this helpe, they would haue 401

beene foure times as long in comming vp. But there doth not occur to me, at this preſent, any vſe thereof, for profit; Except it ſhould be for Sowing of *Peaſe*; which haue their Price very much increaſed, by the early Comming. It may bee tried alſo with *Cherries*, *Straw-beries*, and other Fruit, which are deareſt, when they come early.

402 There was *Wheat* ſteeped in *Water* mixed with *Cow-dung*; Other in *Water* mixed with *Horſe-dung*; Other in *Water* mixed with *Pigeon-dung*; Other in *Vrine* of *Man*; Other in *Water* mixed with *Chalke* powdred; Other in *Water* mixed with *Soot*; Other in *Water* mixed with *Aſhes*; Other in *Water* mixed with *Bay-Salt*; Other in *Claret Wine*; Other in *Malmſey*; Other in *Spirit* of *Wine*. The Proportion of the Mixture was a fourth Part of the Ingredients to the *Water*; Saue that there was not of the *Salt* aboue an eighth Part. The *Vrine*, and *Wines*, and *Spirit* of *Wine*, were Simple without Mixture of *Water*. The Time of the Steeping was twelue houres. The Time of the Yeere *October*. There was alſo other *Wheat* ſowne *vnſteeped*, but *watred* twice a day with *Warme Water*. There was alſo other *Wheat* ſowne *Simple* to compare it with the reſt. The Euent was; That thoſe that were in the Mixture of *Dung*, and *Vrine*, and *Soot*, *Chalke*, *Aſhes*, and *Salt*, came vp within ſix dayes: And thoſe that afterwards proued the Higheſt, Thickeſt, and moſt Luſty, were; Firſt, the *Vrine*; And then the *Dungs*; Next the *Chalke*, Next the *Soot*; Next the *Aſhes*; Next the *Salt*; Next the *Wheat Simple* of it ſelfe, vnſteeped, and vnwatred; Next the *Watred twice a* day with warme water; Next the *Claret Wine*. So that theſe three laſt were ſlower than the ordinary *Wheat* of it ſelfe; And this Culture did rather retard, than aduance. As for thoſe that were ſteeped in *Malmſey*, and *Spirit* of *Wine*, they came not vp at all. This is a Rich *Experiment* for Profit: For the moſt of the Steepings are Cheape Things; And the Goodneſſe of the Crop is a great Matter of Gaine; If the Goodneſſe of the Crop anſwer the Earlineſſe of the Comming vp: As it is like it will; Both being from the vigour of the *Seed*; Which alſo partly appeared in the Former *Experiments*, as hath beene ſaid. This *Experiment* would bee tried in other *Graines*, *Seeds*, and *Kernels*: For it may bee ſome *Steeping* will agree beſt with ſome *Seeds*. It would bee tried alſo with *Roots* ſteeped as before, but for *Longer Time*. It would bee tried alſo in *Seuerall Seaſons* of the *Yeere*, eſpecially the *Spring*.

403 *Straw-berries* watred now and then (as once in three dayes) with *Water*, wherein hath beene ſteeped *Sheeps-dung*, or *Pigeons-dung*, will preuent and come early. And it is like, the ſame Effect would follow in other *Berries*, *Herbs*, *Flowers*, *Graines*, or *Trees*. And therefore it is an *Experiment*, though vulgar in *Straw-berries*, yet not brought into vſe generally: For it is vſuall to helpe the Ground with Mucke; And likewiſe to Recomfort it ſometimes with Mucke put to the Roots; But to water it with *Mucke water*, which is like to bee more Forcible, is not practiſed.

404 *Dung*, or *Chalke*, or *Bloud*, applied in Subſtance, (ſeaſonably) to the Roots

Roots of Trees, doth set them forwards. But to doe it vnto *Herbs*, without Mixture of *Water* or *Earth*, it may bee these Helpes are too Hot.

The former *Meanes* of Helping *Germination*, are either by the *Goodnesse* and *Strength* of the *Nourishment*; Or by the *Comforting*, and *Exciting* the *Spirits* in the *Plant*, to draw the Nourishment better. And of this latter kinde, concerning the *Comforting* of the *Spirits* of the *Plant*, are also the Experiments that follow; Though they bee not Applications to the *Root*, or *Seed*. The *Planting* of *Trees warme* vpon a *Wall*, against the South, or South-East Sunne, doth hasten their Comming on, and Ripening; And the South-East is found to bee better than the South-West, though the South-West bee the Hotter Coast. But the cause is chiefly, for that the Heat of the Morning succeedeth the Cold of the Night: and partly, because (many times) the South-West Sunne is too Parching. So likewise the *Planting* of them vpon the *Backe* of a *Chimney*, where a *Fire* is kept, doth hasten their Comming on, and Ripening: Nay more, the *Drawing* of the *Boughes* into the *Inside* of a *Roome*, where a Fire is continually kept, worketh the same Effect: Which hath been tried with Grapes; In so much as they will come a Moneth earlier, than the Grapes abroad. 405

Besides the two *Meanes* of *Accelerating Germination*, formerly described; That is to say, the *Mending* of the *Nourishment*; and *Comforting* of the *Spirit* of the *Plant*; there is a Third; Which is the *Making way* for the *Easie Comming* to the *Nourishment*, and *Drawing* it. And therefore *Gentle Digging* and *Loosening* of the *Earth* about the *Roots* of *Trees*; And the *Removing Herbs* and *Flowers* into new Earth, once in two yeares, (which is the same thing; For the new Earth is euer looser) doth greatly further the *Prospering*, and *Earlinesse* of *Plants*. 406

But the most admirable *Acceleration* by *Facilitating* the *Nourishment*, is that of *Water*. For a *Standard* of a *Damaske* Rose with the *Root* on, was set in a Chamber, where no Fire was, vpright in an *Earthen Panne*, full of *Faire water*, without any Mixture, halfe a foot vnder the *Water*; the *Standard* being more than two foot high aboue the *water*: Within the Space of ten dayes, the *Standard* did put forth a faire Greene Leafe, and some other little Buds, which stood at a stay, without any Shew of decay or withering, more than seuen Dayes. But afterwards that Leafe faded, but the young Buds did sprout on; which afterward opened into faire Leaues, in the space of three Moneths; And continued so a while after, till vpon Remoue all wee left the Triall. But note that the *Leaues* were somewhat paler, and lighter coloured, than the *Leaues* vse to bee abroad. Note that the first *Buds* were in the End of *October*; And it is likely that if it had beene in the *Spring* time, it would haue put forth with greater strength, and (it may bee) to haue growne on to beare Flowers. By this Meanes, you may haue (as it seemeth) *Roses* set in the middest of a *Poole*, being supported with some stay; Which is Matter of Rarenesse and Pleasure, though of small Vse. This is the more 407

ſtrange, for that the like *Roſe-ſtandard* was put, at the ſame time, into *Water* mixed with *Horſe-dung*, the Horſe-dung about the fourth Part to the *Water*, and in foure Moneths ſpace (while it was obſerued) put not forth any *Leafe*, though diuers *Buds* at the firſt, as the other.

408 A *Dutch Flower*, that had a *Bulbous Root*, was likewiſe put at the ſame time, all vnder *Water*, ſome two or three Fingers deepe; And within ſeuen dayes ſprouted, and continued long after, further Growing. There were alſo put in, a *Beet-Root*, a *Borrage-Root*, and a *Raddiſh Root*, which had all their *Leaues* cut almoſt cloſe to the *Roots*; And within ſix weekes had faire *Leaues*; And ſo continued till the end of *Nouember*.

409 Note, that if *Roots*, or *Peaſe*, or *Flowers*, may bee *Accelerated* in their *Comming* and *Ripening*, there is a double Profit; The one in the high *Price* that thoſe Things beare when they come early: The other in the *Swiftneſſe* of their *Returnes*: For in ſome Grounds which are ſtrong, you ſhall haue a *Raddiſh*, &c. come in a Moneth; That in other Grounds wil not come in two; And ſo make double *Returnes*.

410 *Wheat* alſo was put into the *Water*, and came not forth at all; So as it ſeemeth there muſt bee ſome Strength and Bulke in the Body, put into the *Water*, as it is in *Roots*; For *Graines* or *Seeds*, the Cold of the *Water* will mortifie. But caſually ſome *Wheat* lay vnder the Pan, which was ſomewhat moiſtened by the Suing of the Pan; which in ſix weekes (as aforeſaid) looked mouldy to the Eye, but it was ſprouted forth halfe a fingers length.

411 It ſeemeth by theſe *Inſtances* of *water*, that for Nouriſhment, the *Water* is almoſt all in all, and that the *Earth* doth but keepe the *Plant* vpright, and ſaue it from Ouer-heat, and Ouer-cold; And therefore is a Comfortable *Experiment* for good *Drinkers*. It proueth alſo that our former *Opinion*; That Drinke incorporate with Fleſh, or Roots, (as in *Capon-Beere*, &c.) will nouriſh more eaſily, than Meat and Drinke taken ſeuerally.

412 The *Houſing* of *Plants* (I conceiue) will both *Accelerate Germination*, and bring forth *Flowers* and *Plants* in the *Colder Seaſons*: And as wee *Houſe Hot-Countrey Plants*, as *Limons*, *Orenges*, *Myrtles*, to ſaue them; So wee may *Houſe* our owne *Countrey Plants*, to forward them, and make them come in the Cold Seaſons; In ſuch ſort, that you may haue *Violets*, *Straw-berries*, *Peaſe*, all Winter: So that you ſow, or remoue them at fit times. This *Experiment* is to bee referred vnto the *Comforting* of the *Spirit* of the *Plant*, by *Warmth*, as well as *Houſing* their *Boughes*, &c. So then the *Meanes*, to *Accelerate Germination*, are in Particular eight, in Generall three.

Experiments in Conſort, touching the *Putting backe* or *Retardation* of *Germination*.

413 TO make *Roſes*, or other *Flowers* come late, it is an *Experiment* of Pleaſure. For the Ancients eſteemed much of *Roſa Sera*. And indeed the *Nouember-Roſe* is the ſweeteſt, hauing beene leſſe exhaled by the Sunne. The Meanes are theſe. Firſt, the *Cutting off their Tops*, immediately after they haue done Bearing; And then they will come againe

the

the same yeare about *Nouember*: But they will not come iust on the Tops, where they were cut, but out of those Shoots, which were (as it were,) *Water-Boughes*. The *Cause* is, for that the Sap, which otherwise would haue fed the Top, though after Bearing,) will, by the discharge of that, diuert vnto the Side-Sprouts; And they will come to beare, but later.

The Second is the *Pulling off the Buds of the Rose*, when they are *Newly knotted*; For then the Side-Branches will beare. The *Cause* is the same with the former: For *Cutting off the Tops*, and *Pulling off the Buds*, worke the same Effect, in Retention of the Sap for a time, and Diuersion of it to the Sprouts, that were not so forward. 414

The Third is the *Cutting* off some few of the *Top-boughes* in the *Spring-time*, but suffering the lower Boughes to grow on. The *Cause* is, for that the Boughes doe helpe to draw vp the Sap more strongly; And wee see that in Powling of Trees, many doe vse to leaue a Bough or two on the Top, to helpe to draw vp the Sap. And it is reported also, that if you graft vpon the Bough of a Tree, and cut off some of the old Boughes, the new Cions will perish. 415

The Fourth is by *Laying the Roots bare about Christmas*, some dayes. The *Cause* is plaine, for that it doth arrest the Sappe, from going vpwards, for a time; Which Arrest is afterwards released by the Couering of the Root againe with Earth; And then the Sap getteth vp, but later. 416

The Fifth is the *Removing* of the *Tree*, some Moneth before it *Budded*. The *Cause* is, for that some time will bee required after the *Remoue*, for the Resetling, before it can draw the Iuyce: And that time being lost, the Blossome must needs come forth later. 417

The Sixth is the *Grafting* of *Roses* in *May*, which commonly Gardiners doe not till *Iuly*; And then they beare not till the Next Yeare; But if you graft them in *May*, they will beare the same yeare, but late. 418

She Seuenth is, the *Girding* of the *Body* of the *Tree* about with some Packe-thread; For that also, in a degree, restraineth the Sap, and maketh it come vp, more late, and more Slowly. 419

The Eighth is, the *Planting* of them in a *Shade*, or in a *Hedge*; The *Cause* is, partly the Keeping out of the Sunne, which hasteneth the Sap to rise; And partly the Robbing of them of Nourishment, by the Stuffe in the *Hedge*. These Meanes may bee practised vpon other, both Trees, and Flowers, *Mutatis Mutandis*. 420

Men haue entertained a Conceit that sheweth prettily; Namely, that if you graft a *Late-Comming Fruit*, vpon a Stocke of a *Frnit-tree*, that *Commeth early*, the Graft will beare *Fruit early*; As a Peach upon a Cherry; And contrariwise, if an *Early-Comming-Fruit* vpon a Stocke of a *Fruit-tree* that *Commeth late*, the Graft will beare Fruit late; As a Cherry vpon a Peach. But these are but Imaginations, and vntrue. The *Cause* is, for that the Cions ouer-ruleth the Stocke quite; And the Stocke is but Passiue onely, and giueth Aliment, but no Motion to the Graft. 421

We

Experiments in Conſort, touching the *Melioration* of *Fruits*, *Trees*, and *Plants*.

Wee will ſpeake now, how to make *Fruits*, *Flowers*, and *Roots* larger; in more plenty; and ſweeter; than they vſe to bee; And how to make the *Trees* themſelues, more Tall; more Spread; and more Haſtie and Sudden; than they vſe to be. Wherein there is no doubt, but the former *Experiments* of *Acceleration*, will ſerue much to theſe purpoſes. And againe, that theſe *Experiments*, which wee ſhall now ſet downe, doe ſerue alſo for *Acceleration*; becauſe both Effects proceed from the Encreaſe of Vigour in the Tree: But yet to auoid Confuſion; And becauſe ſome of the Meanes are more proper for the one Effect, and ſome for the other, wee will handle them apart.

422 It is an aſſured Experience, that an *Heap* of *Flint*, or *Stone*, laid about the *Bottome* of a *Wilde-Tree*, (as an Oake, Elme, Aſh, &c.) vpon the firſt Planting, doth make it proſper double as much, as without it. The *Cauſe* is, for that it retaineth the Moiſture, which falleth at any time vpon the *Tree*, and ſuffereth it not to bee exhaled by the Sunne. Againe, it keepeth the Tree warme, from Cold Blaſts and Froſts, as it were in an Houſe. It may be alſo, there is ſomewhat in the Keeping of it ſteady at the firſt. *Quære*, if Laying of Straw ſome Height about the Body of a *Tree*, will not make the *Tree* forwards. For though the Root giueth the Sap, yet it is the Body that draweth it. But you muſt note, that if you lay *Stones* about the ſtalke of Lettuce, or other Plants, that are more ſoft, it will ouer-moiſten the Roots, ſo as the Wormes will eat them.

423 A *Tree*, at the firſt *Setting*, ſhould not bee *Shaken*, vntill it hath *taken Root fully*: And therefore ſome haue put two little Forkes about the Bottome of their *Trees*, to keepe them vpright; But after a yeares Rooting, then Shaking doth the *Tree* good, by Looſening of the Earth, and (perhaps) by Exerciſing (as it were) and Stirring the Sap of the *Tree*.

424 Generally, the *Cutting away* of *Boughes* and *Suckers* at the *Root* and *Body*, doth make *Trees* grow high; And contrariwiſe, the *Powling* and *Cutting* of the Top, maketh them grow ſpread, and Buſhy. As we ſee in *Pollards*, &c.

425 It is reported, that to make *haſty Growing Coppice-Woods*, the way is, to take *Willow*, *Sallow*, *Poplar*, *Alder*, of ſome ſeuen yeares growth; And to ſet them, not vpright, but a-ſlope, a reaſonable depth vnder the Ground; And then, in ſtead of one Root, they will put forth many, and ſo carry more Shoots vpon a Stemme.

426 When you would haue *many new Roots* of *Fruit-Trees*, take a *Low Tree*, and bow it, and lay all his branches a-flat vpon the Ground, and caſt Earth vpon them; And euery Twigge will take Root. And this is a very profitable *Experiment* for Coſtly *Trees*; (for the Boughes will make Stockes

Stockes without charge;) Such as are *Apricots*, *Peaches*, *Almonds*, *Cornelians*, *Mulberies*, *Figs*, &c. The like is continually practiſed with *Vines*, *Roſes*, *Muske-Roſes*, &c.

From *May* to *Iuly* you may take off the *Barke* of any *Bough*, being of the Bigneſſe of three or foure Inches, and couer the bare Place, ſomewhat aboue, and below, with Loame well tempered with Horſe-dung, binding it faſt downe. Then cut off the Bough about *Alhollontide* in the bare place, and ſet it in the Ground; And it will grow to be a faire *Tree* in one Yeare. The *Cauſe* may be, for that the *Baring* from the *Barke* keepeth the *Sap* from deſcending towards Winter, and ſo holdeth it in the Bough; And it may be alſo that the Loame and Horſe-Dung applied to the bare place, doe moiſten it, and cheriſh it, and make it more apt to put forth the Root. Note, that this may be a generall Meanes for keeping vp the Sap of *Trees* in their Boughes; Which may ſerue to other Effects. 427

It hath beene practiſed in *Trees*, that ſhew faire, and beare not, to *Bore a Hole* thorow the *Heart* of the *Tree*, and thereupon it will beare. Which may be for that the *Tree* before had too much *Repletion*, and was oppreſſed with his owne Sap, for *Repletion* is an Enemie to Generation. 428

It hath beene practiſed in *Trees*, that doe not beare, to cleaue two or three of the Chiefe Roots, and to put into the Cleft a ſmall Pebble, which may keepe it open, and then it will beare. The *Cauſe* may be, for that a Root of a Tree may be (as it were,) Hide-bound, no leſſe than the Body of the Tree; But it will not keepe open without ſomewhat put into it. 429

It is vſually practiſed, to ſet *Trees* that require much *Sunne*, vpon *walls* againſt the *South*; As *Apricots*, *Peaches*, *Plums*, *Vines*, *Figs*, and the like. It hath a double Commodity; The one, the *Heat* of the *wall* by *Reflection*; The other, the *Taking away* of the *Shade*; For when a *Tree* groweth round, the vpper Boughes ouer-ſhadow the lower; But when it is ſpread vpon a Wall, the Sunne commeth alike, vpon the vpper, and lower Branches. 430

It hath alſo beene practiſed (by ſome) to pull off ſome *Leaues* from the *Trees* ſo *ſpread*, that the Sunne may come vpon the *Bough* and *Fruit* the better. There hath beene practiſed alſo a Curioſity, to ſet a *Tree* vpon the *North-Side* of a Wall, and at a little height, to draw him thorow the Wall, and ſpread him vpon the *South-Side*: Conceiuing that the Root and lower Part of the Stocke ſhould enioy the freſhneſſe of the Shade; And the Vpper Boughes, and Fruit, the Comfort of the Sunne. But it ſorted not; The *Cauſe* is, for that the *Root* requireth ſome Comfort from the Sunne, though vnder Earth, as well as the *Body*: And the Lower Part of the Body more than the Vpper, as wee ſee in Compaſſing a *Tree* below with Straw, 431

The *Lowneſſe* of the *Bough*, where the *Fruit* commeth, maketh the *Fruit* greater, and to ripen better; For you ſhall euer ſee in *Apricots*. 432

Peaches,

Peaches, or *Melo-Cotones*, vpon a wall, the greateſt Fruits towards the Bottome. And in *France* the *Grapes* that make the *Wine*, grow vpon low Vines, bound to ſmall Stakes. And the raiſed Vines in Arbours make but Veriuyce. It is true, that in *Italy*, and other *Countries*, where they haue hotter Sunne, they raiſe them vpon *Elmes*, and Trees; But I conceiue, that if the *French* Manner of Planting low, were brought in vſe there, their *Wines* would be ſtronger and ſweeter. But it is more chargeable in reſpect of the Props. It were good to trie whether a *Tree* grafted ſomewhat neare the Ground, and the lower boughes only maintained, and the higher continually proined off, would not make a larger *Fruit*.

433 To haue *Fruit* in *Greater Plenty*, the way is, to graft, not onely vpon young *Stocks*, but vpon diuers *Boughes* of an old *Tree*; for they will beare great Numbers of Fruit; Whereas if you graft but vpon one Stocke, the *Tree* can beare but few.

434 The *Digging* yearely about the *Roots* of *Trees*, which is a great means, both to the *Acceleration* and *Melioration* of *Fruits*, is practiſed in nothing but in *Vines*; Which if it were transferred vnto other *Trees*, and *Shrubs*, (as *Roſes*, &c.) I conceiue would aduance them likewiſe.

435 It hath beene knowne, that a *Fruit-Tree* hath beene blowne vp (almoſt) by the Roots, and ſet vp againe, and the next yeare bare exceedingly. The *Cauſe* of this, was nothing but the *Looſening* of the *Earth*, which comforteth any *Tree*, and is fit to be practiſed, more than it is, in *Fruit-Trees*: For *Trees* cannot be ſo fitly remoued into New Grounds, as *Flowers* and *Herbs* may.

436 To reuiue an *Old Tree*, the Digging of it about the *Roots*, and Applying new Mould to the Roots, is the way. We ſee alſo that *Draught-Oxen*, put into freſh Paſture, gather new and tender Fleſh: And in all Things, better nouriſhment than hath beene vſed, doth helpe to renew; Eſpecially, if it be not onely better, but changed, and differing from the former.

437 If an *Herbe* be cut off from the *Roots*, in the beginning of Winter, and then the Earth be trodden and beaten downe hard, with the Foot and Spade, the *Roots* will become of very great Magnitude in Summer. The Reaſon is, for that the Moiſture being forbidden to come vp in the Plant, ſtayeth longer in the Root, and ſo dilateth it. And *Gardiners* vſe to tread downe any looſe Ground, after they haue ſowne *Onions*, or *Turnips*, &c.

438 If *Panicum* be laid below, and about the Bottome of a *Root*, it will cauſe the Root to grow to an Exceſſiue Bigneſſe. The *Cauſe* is, for that being it ſelfe of a Spungy Subſtance, it draweth the Moiſture of the Earth to it, and ſo feedeth the Root. This is of greateſt vſe for *Onions*, *Turnips*, *Parſnips*, and *Carrets*.

439 The *Shifting* of *Ground* is a Meanes to better the *Tree*, and Fruit; But with this Caution; That all Things do proſper beſt, when they are aduanced to the better: Your *Nurſery* of *Stocks* ought to be in a more Barren

Barren Ground, than the Ground is whereunto you remoue them. So all *Graziers* preferre their Cattell from meaner Pastures to better. We see also, that Hardnesse in Youth lengthneth Life, because it leaueth a Cherishing to the better of the Bodie, in Age: Nay in Exercises, it is good to beginne with the hardest, as Dancing in Thicke Shooes, &c.

It hath beene obserued, that *Hacking* of *Trees* in their *Barke*, both downe-right, and acrosse, so as you make them rather in slices, than in continued Hackes, doth great good to *Trees*; And especially deliuereth them from being *Hide-bound*, and killeth their Mosse. 440

Shade to some *Plants* conduceth to make them large, and prosperous, more than *Sunne*; As in *Strawberries*, and *Bayes*, &c. Therefore amongst *Strawberries*, sow here and there some *Borrage-Seed*; And you shall finde the *Strawberries* vnder those Leaues farre more large than their Fellowes. And *Bayes* you must plant to the *North*; Or defend them from the *Sunne* by a Hedge-Row; And when you sow the *Berries*, weed not the *Borders*, for the first halfe yeare; For the *weed* giueth them *Shade*. 441

To increase the *Crops* of *Plants*, there would be considered, not only the *Increasing* the *Lust* of the *Earth*, or of the *Plant*, but the sauing also of that which is spilt. So they haue lately made a Triall, to *Set Wheat*, which neuertheless hath beene left off, because of the trouble and paines; Yet so much is true, that there is much saued by the *Setting*, in comparison of that which is *Sowen*; Both by keeping it from being picked vp by Birds; And by Auoiding the Shallow lying of it, whereby much that is sowen taketh no Root. 442

It is prescribed by some of the *Ancients*, that you take *Small Trees*, vpon which *Figs* or other *Fruit* grow, being yet vnripe, and couer the *Trees* in the Middle of *Autumne* with dung, vntill the Spring; And then take them vp in a warme day, and replant them in good ground; And by that meanes, the former yeares *Tree* will be ripe, as by a new Birth; when other *Trees* of the same kind, doe but blossome. But this seemeth to haue no great Pobability. 443

It is reported, that if you take *Nitre*, and mingle it with *Water*, to the thicknesse of *Honey*, and therewith annoint the *Bud*, after the *Vine* is cut, it will sprout forth within eight dayes. The *Cause* is like to be, (if the *Experiment* be true,) the Opening of the *Bud*, and of the Parts Contiguous, by the Spirit of the *Nitre*; For *Nitre* is (as it were) the Life of *Vegetables*. 444

Take *Seed*, or *Kernels* of *Apples*, *Peares*, *Orenges*; Or a *Peach*, or a *Plum-Stone*, &c. And put them into a *Squill*, (which is like a great *Onion*,) and they will come vp much earlier than in the *Earth* it selfe. This I conceiue to bee as a Kinde of *Grafting* in the *Root*; For as the Stocke of a Graft yeeldeth better prepared nourishment to the Graft, than the Crude Earth; So the *Squill* doth the like to the *Seed*. And I suppose the same would be done, by Putting *Kernells* into a *Turnip*, or 445

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the like; Saue that the *Squill* is more Vigorous and Hot. It may be tried also, with putting *Onion-Seed* into an *Onion-Head*, which thereby (perhaps) will bring forth a larger, and earlier *Onion*.

446 The *Pricking* of a *Fruit* in seuerall places, when it is almost at his Bigneſſe, and before it ripeneth, hath beene practiſed with ſucceſſe, to ripen the Fruit more ſuddenly. Wee ſee the Example of the *Biting* of *Waſpes*, or *Wormes*, vpon *Fruit*, whereby it (manifeſtly) ripeneth the ſooner.

447 It is reported, that *Alga Marina* (*Sea-weed*) put vnder the *Roots of Cole worts*, and (perhaps) of other *Plants*, will further their Growth. The vertue (no doubt) hath Relation to *Salt*, which is a great Helpe to Fertility.

448 It hath beene practiſed, to cut off the Stalkes of *Cucumbers*, immediatly after their *Bearing*, cloſe by the Earth; And then to caſt a prettie Quantity of Earth vpon the *Plant* that remaineth; and they will beare the next yeare Fruit, long before the ordinary time. The *Cauſe* may be, for that the Sap goeth downe the ſooner, and is not ſpent in the Stalke or Leafe, which remaineth after the Fruit. Where note, that the *Dying*, in the Winter, of the *Roots* of *Plants*, that are *Annuall*, ſeemeth to bee partly cauſed by the Over-Expence of the Sap into Stalke and Leaues; which being preuented, they will ſuper-annate, if they ſtand warme.

449 The *Pulling off* many of the *Bloſſomes* from *a Fruit-Tree*, doth make the *Fruit* fairer. The *Cauſe* is manifeſt; For that the Sap hath the leſſe to nouriſh. And it is a Common Experience, that if you doe not pull off ſome *Bloſſomes*, the firſt time a *Tree* bloometh, it will bloſſome it ſelfe to death.

450 It were good to try, what would be the Effect, if all the *Bloſſomes* were pulled from a *Fruit-Tree*; Or the *Acornes* and *Cheſnut-buds*, &c. from a *Wilde Tree*, for two yeares together. I ſuppoſe that the *Tree* will either put forth the third yeare, bigger, and more plentifull *Fruit*; Or elſe the ſame yeares, larger Leaues, becauſe of the Sap ſtored vp.

451 It hath beene generally receiued, that a *Plant watered* with *Warme Water*, will come vp ſooner and better, than with Cold Water, or with Showres. But our *Experiment* of *watering Wheat* with *Warme Water* (as hath beene ſaid) ſucceeded not; which may be, becauſe the Tryall was too late in the Yeare, *viz.* in the End of *October*. For the Cold then comming vpon the *Seed*, after it was made more tender by the Warme Water, might checke it.

452 There is no doubt, but that *Grafting* (for the moſt Part) doth *meliorate* the *Fruit*. The *Cauſe* is manifeſt; For that the Nouriſhment is better prepared in the *Stocke*, than in the *Crude Earth*: But yet note well, that there be ſome *Trees*, that are ſaid to come vp more happily from the *Kernell*, than from the *Graft*; As the *Peach*, and *Melocotone*. The *Cauſe* I ſuppoſe to be, for that thoſe *Plants* require a Nouriſhment of great Moiſture; And though the Nouriſhment of the *Stocke* be finer, and

and better prepared, yet it is not so moist, and plentifull, as the Nourishment of the *Earth*. And indeed we see those *Fruits* are very cold *Fruits* in their Nature.

It hath beene received, that a Smaller *Peare*, grafted vpon a *Stocke* that beareth a greater *Peare*, will become Great. But I thinke it is as true, as that of the *Prime-Fruit* vpon the *Late Stocke*; And *è conuerso*; which wee reiected before: For the *Cions* will gouerne. Neuertheless it is probable enough, that if you can get a *Cions* to grow vpon a *Stocke* of another kinde, that is much moister than his owne *Stocke*, it may make the *Fruit* Greater, because it will yeeld more plentifull Nourishment; Though it is like it will make the *Fruit* Baser. But generally, the *Grafting* is vpon a dryer *Stocke*; As the *Apple* vpon a *Crab*; The *Peare* vpon a *Thorne*; &c. Yet it is reported, that in the *Low-Countries* they will graft an *Apple-Cions* vpon the *Stocke* of a *Cole-wort*, and it will beare a great flaggy *Apple*; The *Kernell* of which, if it be set, will be a *Cole-wort*, and not an *Apple*. It were good to try, whether an *Apple-Cions* will prosper, if it be grafted vpon a *Sallow*, or vpon a *Poplar*, or vpon an *Alder*, or vpon an *Elme*, or vpon an *Horse-Plumme*, which are the moistest of *Trees*. I haue heard that it hath beene tried vpon an *Elme*, and succeeded. 453

It is manifest by Experience, that *Flowers* Remoued wax greater, because the Nourishment is more easily come by, in the loose Earth. It may bee, that Oft Regrafting of the same Cions, may likewise make *Fruit* greater; As if you take a *Cions*, and graft it vpon a *Stocke* the first yeare; And then cut it off, and graft it vpon another *Stocke* the second yeare; and so for a third; Or fourth yeare; And then let it rest, it will yeeld afterward, when it beareth, the greater *Fruit*. 454

Of Grafting *there are many* Experiments *worth the Noting, but those wee reserue to a proper Place.*

It maketh *Figs* better, if a *Fig-Tree*, when it beginneth to put forth Leaues, haue his Top cut off. The cause is plaine, for that the Sap hath the lesse to feed, and the lesse way to mount: But it may bee, the *Fig* will come somewhat later, as was formerly touched. The same may bee tried likewise in other *Trees*. 455

It is reported, that *Mulberries* will bee fairer, and the *Trees* more fruitfull, if you bore the *Trunk* of the *Tree* thorow, in seuerall places, and thrust into the Places bored, Wedges of some Hot *Trees*, as *Turpentine*, *Mastick-Tree*, *Guaiacum*, *Iuniper*, &c. The *Cause* may be, for that Aduentitie Heat doth cheare vp the Native Iuyce of the *Tree*. 456

It is reported, that *Trees* will grow greater, and beare better *Fruit*, if you put *Salt*, or *Lees* of *Wine*, or *Blood* to the *Root*. The *Cause* may bee the Encreasing the Lust or Spirit of the *Root*; These Things being more forcible, than ordinary *Composts*. 457

It is reported by one of the Ancients, that *Artichoakes* will bee lesse prickly, and more tender, if the *Seeds* haue their Tops dulled, or grated off vpon a Stone. 458

459 *Herbs* will bee tenderer, and fairer; if you take them out of *Beds*, when they are newly come vp, and remoue them into *Pots*, with better *Earth*. The Remoue from *Bed* to *Bed* was ſpoken of before; But that was in ſeuerall yeares; This is vpon the ſudden. The *Cauſe* is the ſame with other *Remoues*, formerly mentioned.

460 *Cole-worts* are reported by one of the *Ancients*, to proſper exceedingly, and to be better taſted, if they be ſometimes watred with *Salt water*; And much more with *Water* mixed with *Nitre*; The Spirit of which is leſſe Adurent than *Salt*.

461 It is reported that *Cucumbers* will proue more Tender, and Dainty, if their *Seeds* be *Steeped* (a little) in *Milke*, The *Cauſe* may bee, for that the *Seed* being mollified with the *Milke*, will be too weake to draw the groſſer Iuyce of the Earth, but onely the finer. The ſame *Experiment* may bee made in *Artichoakes*, and other *Seeds*, when you would take away, either their Flaſhineſſe, or Bitterneſſe. They ſpeake alſo, that the like Effect followeth, of *Steeping* in *Water* mixed with *Honey*; But that ſeemeth to me not ſo probable, becauſe *Honey* hath too quicke a Spirit.

462 It is reported that *Cucumbers* will bee leſſe *Watry*, and more *Melon-like*, if in the Pit where you ſet them, you fill it (halfe way vp) with *Chaffe*, or ſmall *Stickes*, and then powre *Earth* vpon them; For *Cucumbers*, as it ſeemeth, doe extremely affect Moiſture; And ouer-drinke themſelues; which this *Chaffe*, or *Chips*, forbiddeth. Nay, it is further reported, that if when a *Cucumber* is growne, you ſet a Pot of water about fiue or ſix inches diſtance from it, it will, in 24. houres, ſhoot ſo much out, as to touch the Pot; Which if it bee true, it is an *Experiment* of an higher Nature, than belongeth to this *Title*: For it diſcouereth *Perception* in *Plants*, to moue towards that which ſhould helpe and comfort them, though it bee at a diſtance. The ancient Tradition of the *Vine* is far more ſtrange: It is, that if you ſet a Stake, or Prop, ſome diſtance from it, it will grow that way; Which is farre ſtranger (as is ſaid) than the other; For that *Water* may worke by a *Sympathy* of *Attraction*: But this of the *Stake* ſeemeth to bee a Reaſonable Diſcourſe.

463 It hath beene touched before, that *Terebration* of *Trees* doth make them proſper better. But it is found alſo, that it maketh the *Fruit* ſweeter, and better. The *Cauſe* is, for that notwithſtanding the *Terebration*, they may receiue Aliment ſufficient; And yet no more than they can well turne, and diſgeſt; And withall doe ſweat out the courſeſt and vnprofitableſt Iuyce; Euen as it is in *Liuing Creatures*, which by Moderate Feeding, and Exerciſe, and Sweat, attaine the ſoundeſt Habit of Body.

464 As *Terebration* doth *Meliorate Fruit*, ſo, vpon the like reaſon, doth *Letting* of *Plants Blood*; As *Pricking Vines*, or other *Trees*, after they bee of ſome Growth; And thereby letting forth *Gum*, or *Teares*; Though this be not to continue, as it is in *Terebration*, but at ſome Seaſons. And it is reported, that by this Artifice, *Bitter Almonds* haue beene turned into *Swees*.

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The Ancients for the *Dulcorating* of *Fruit*, doe commend *Swines-dung*, aboue all other *Dung*; Which may be, because of the Moisture of that Beast, whereby the *Excrement* hath lesse Acrimony, For we see *Swines* and *Pigs* Flesh is the Moistest of Flesshes. 465

It is obserued by some, that all *Herbs* wax sweeter, both in Smell, and Taste, if after they be growne vp some reasonable time, they bee cut, and so you take the later Sprout. The *Cause* may bee, for that the longer the Iuyce stayeth in the Root, and Stalke, the better it concocteth. For one of the Chiefe Causes, why *Graines*, *Seeds*, and *Fruits*, are more Nourishing than *Leaues*, is the Length of time, in which they grow to *Maturation*. It were not amisse to keepe backe the Sap of *Herbs*, or the like, by some fit meanes, till the end of Summer; whereby (it may be) they will be more Nourishing. 466

As *Grafting* doth Generally aduance and *Meliorate Fruits*, aboue that which they would bee, if they were set of *Kernels*, or *Stones*, in regard the *Nourishment* is better concocted; so (no doubt) euen in *Grafting*, for the same Cause the Choice of the *Stocke* doth much; Alwayes prouided, that it bee somewhat inferiour to the *Cions*: For otherwise it dulleth it. They commend much the *Grafting* of *Peares*, or *Apples*, vpon a *Quince*. 467

Besides the *Meanes* of *Melioration* of *Fruits*, before mentioned, it is set downe as tried, that a *Mixture* of *Bran*, and *Swines-dung*; Or *Chaffe* and *Swines-dung*; (especially laid vp together for a Moneth to rot,) is a very great Nourisher, and Comforter to a *Fruit-Tree*. 468

It is deliuered, that *Onions* wax greater, if they bee taken out of the Earth, and laid a drying twenty daies, and then set againe; And yet more, if the outermost Pill be taken off all ouer. 469

It is deliuered by some, that if one take the *Bough* of a *Low Fruit-Tree*, newly budded, and draw it gently, without hurting it, into an *Earthen* Pot perforate at the Bottome to let in the *Plant*, and then Couer the *Pot* with Earth, it will yeeld a very large *Fruit*; within the Ground. Which *Experiment* is Nothing but *Potting* of *Plants*, without Remouing, and Leauing the *Fruit* in the Earth. The like, (they say,) will be effected; by an Empty *Pot*, without Earth in it, put ouer a *Fruit*, being propped vp with a *Stake*, as it hangeth vpon the *Tree*; And the better, if some few Pertusions bee made in the *Pot*. Wherein, besides the Defending of the *Fruit*, from Extremity of Sunne or Weather, some giue a reason, that the *Fruit*, Louing and Coueting the open Aire and Sunne, is inuited by those Pertusions, to spread and approach, as neere the open Aire, as it can; And so enlargeth in *Magnitude*. 470

All *Trees* in *High* and *Sandy Grounds*, are to bee set deepe; And in *watry Grounds*, more shallow. And in all *Trees*, when they be remoued (especially *Fruit-Trees*) care ought to be taken, that the Sides of the *Trees* bee coasted, (*North*, and *South*, &c.) as they stood before. The same is said also of *Stone* out of the *Quarry*, to make it more durable; Though that 471

seemeth to haue lesse reason; Because the *Stone* lyeth not so neere the Sun, as the *Tree* groweth.

472 *Timber Trees* in a *Coppice Wood*, doe grow better, than in an *Open Field*; Both because, they offer not to spread so much, but shoot vp still in Height; And chiefly because they are defended from too much Sunne and Wind, which doe checke the Growth of all *Fruit*; And so (no doubt) *Fruit-Trees*, or *Vines*, set vpon a *Wall*, against the Sunne, betweene Elbowes or Buttresses of Stone, ripen more, than vpon a Plaine Wall.

473 It is said, that if *Potado Roots*, be set in a *Pot* filled with Earth, and then the *Pot* with Earth bee set likewise within the Ground, some two or three Inches, the *Roots* will grow greater, than Ordinary. The *Cause* may bee, for that hauing Earth enough within the *Pot* to nourish them; And then being stopped by the Bottome of the *Pot* from putting Strings downward, they must needs grow greater in Breadth and Thicknesse. And it may be, that all *Seeds*, or *Roots*, *Potted*, and so set into the *Earth*, will prosper the better.

474 The *Cutting off* the *Leaues* of *Radish*, or other *Roots*, in the beginning of Winter, before they wither; And couering againe the *Root*, something high with Earth; Will preserue the *Root* all Winter, and make it bigger, in the Spring following, as hath beene partly touched before. So that there is a double Vse of this *Cutting off* the *Leaues*: For in *Plants*, where the *Root* is the *Esculent*, as *Radish*, and *Parsnips*, it will make the *Root* the greater: And so it will doe to the *Heads* of *Onions*. And where the *Fruit* is the *Esculent*, by Strengthening the *Root*, it will make the *Fruit* also the greater.

475 It is an *Experiment* of great pleasure, to make the *Leaues* of *Shady Trees*, larger than ordinary. It hath beene tried (for certaine) that a *Cions* of a *Weech-Elme*, grafted vpon the Stocke of an Ordinary *Elme*, will put forth Leaues, almost as broad as the Brim of ones Hat. And it is very likely, that as in *Fruit-Trees*, the *Graft* maketh a greater *Fruit*; So in *Trees* that beare no *Fruit*, it will make the greater *Leaues*. It would be tried therefore in *Trees* of that kind chiefly; As *Birch*, *Aspe*, *Willow*; And especially the *Shining Willow*, which they call *Swallow-taile*, because of the pleasure of the Leafe.

476 The *Barrennesse* of *Trees*, by *Accident*, (besides the *Weakenesse* of the *Soile*, *Seed*, or Root; And the *Iniury* of the *Weather*) commeth either of their *Ouer-growing* with *Mosse*; Or their being *Hide-bound*; Or their *Planting too deepe*; Or by *Issuing* of the *Sap too much into the Leaues*. For all these there are *Remedies* mentioned before.

Experiments in Consort, touching *Compound Fruits* and *Flowers*.

Wee see that in *Liuing Creatures*, that haue *Male* and *Female*, there is Copulation of seuerall Kindes; And so *Compound Creatures*; As the *Mule*, that is generated betwixt the *Horse* and the *Asse*; And some other *Compounds*, which wee call *Monsters*,

sters, though more rare: And it is held, that that *Prouerbe*, *Africa semper aliquid Monstri parit*; commeth, for that the Fountaines of Waters there, being rare, diuers sorts of Beasts come from seuerall Parts to drinke; And so being refreshed, fall to couple, and many times with seuerall Kinds. The *Compounding* or *Mixture* of *Kinds* in *Plants* is not found out; Which neuertheless, if it be possible, is more at command, than that of *liuing Creatures*; For that their Lust requireth a voluntary Motion: wherefore it were One of the most Noble *Experimens* touching *Plants*, to finde it out: For so you may haue great Variety of New *Fruits*, and *Flowers* yet vnknowne. *Grafting* doth it not: That mendeth the *Fruit*, or doubleth the *Flowers*, &c. But it hath not the Power to make a *New Kinde*. For the *Cions* euer ouer-ruleth the *Stocke*.

It hath beene set downe by one of the *Ancients*, that if you take two *Twigs* of seuerall *Fruit Tres*, and flat them on the sides, and then binde them close together, and set them in the ground, they will come vp in one Stocke; But yet they will put forth their seuerall *Fruits*, without any *Commixture* in the *Fruit*. Wherein note (by the way) that *Vnity* of *Continuance*, is easier to procure, than *Vnity* of *Species*. It is reported also, that *Vines* of *Red* and *white Grapes*, being set in the Ground, and the vpper Parts being flatted, and bound close together, will put forth *Grapes* of the seuerall Colours vpon the same Branch; And *Grapestones* of seuerall Colours within the same *Grape*: But the more, after a yeere or two; The Vnity (as it seemeth) growing more Perfect. And this will likewise helpe, if from the first *Vniting*, they be often Watred; For all Moisture helpeth to *Vnion*. And it is prescribed also, to binde the *Bud*, as soone as it commeth forth, as well as the *Stocke*; At the least for a time. 477

They report, that diuers *Seeds*, put into a *Clout*, and laid in Earth well dunged, will put vp *Plants Contiguous*; Which (afterwards) being bound in, their *Shoots* will *Incorporate*. The like is said of *Kernels*, put into a *Bottle*, with a Narrow Mouth, filled with Earth. 478

It is reported, that young *Trees*, of seuerall kinds, set contiguous, without any binding, and very often Watred, in a *Fruitfull Ground*, with the very Luxury of the *Trees*, will incorporate, and grow together. Which seemeth to me the likeliest Meanes, that hath beene propounded; For that the *Binding* doth hinder the Naturall Swelling of the *Tree*; which, while it is in Motion, doth better *vnite*. 479

Experiments in Consort touching the *Sympathy* and *Antipathy* of *Plants*.

There are many Ancient and Receiued Traditions, and Obseruations, touching the *Sympathy* and *Antipathy* of *Plants*:

For that some will thriue best growing neere others ; which they impute to *Sympathy* : And some worse ; which they impute to *Antipathy*. But these are Idle and Ignorant Conceits ; And forsake the true *Indication* of the *Causes* ; As the most Part of *Experiments*, that concerne *Sympathies* and *Antipathies* doe. For as to *Plants*, neither is there any such Secret *Friendship*, or *Hatred*, as they imagine ; And if wee should bee content to call it *Sympathy*, and *Antipathy*, it is vtterly mistaken ; for their *Sympathy*, is an *Antipathy*, and their *Antipathy* is a *Sympathie:* For it is thus ; Whersoeuer one *Plant* draweth such a particular Iuyce out of the Earth ; as it qualifieth the Earth ; So as that Iuyce which remaineth is fit for the other Plant, there the Neighbourhood doth good ; Because the Nourishments are contrary, or seuerall : But where two *Plants* draw (much) the same Iuyce, there the Neighbourhood hurteth ; For the one deceiueth the other.

480 First therefore, all *Plants* that doe draw much *Nourishment* from the *Earth*, and so soake the *Earth*, and exhaust it ; hurt all Things that grow by them ; As great *Trees*, (especially *Ashes*) and such *Trees*, as spread their *Roots*, neere the Top of the Ground. So the *Colewort* is not an Enemy (though that were anciently receiued) to the *Vine* onely ; But it is an Enemy to any other *Plant* ; Because it draweth strongly the fattest Iuyce of the Earth. And if it be true, that the *Vine*, when it creepeth neere the *Colewort*, will turne away ; This may be, because there it findeth worse Nourishment ; For though the *Root* be where it was, yet (I doubt) the *Plant* will bend as it nourisheth.

481 Where *Plants* are of seuerall Natures, and draw seuerall Iuyces out of the Earth, there (as hath beene said) the One set by the other helpeth: As it is set downe by diuers of the Ancients, that *Rew* doth prosper much, and becommeth stronger, if it be set by a *Figge-Tree* : which (we conceiue) is caused, Not by Reason of *Friendship* ; but by *Extraction* of a Contrary Iuyce : The one Drawing *Iuyce* fit to result Sweet, the other bitter. So they haue set downe likewise, that a *Rose* set by *Garlick* is sweeter : Which likewise may be, because the more Fetide Iuyce of the Earth goeth into the *Garlicke* ; and the more Odorate into the *Rose*.

482 This wee see manifestly, that there be certaine *Corne-Flowers*, which come seldome or neuer in other places, vnlesse they bee set ; But onely amongst Corne : As the *Blew-bottle*, a kinde of *Yellow Mary-Gold*, *Wilde Poppy*, and *Fumitory*. Neither can this bee, by Reason of the Culture of the Ground, by Plowing, or Furrowing ; As some *Herbs*, and *Flowers*, will grow but in *Ditches* new Cast ; For if the *Ground* lie fallow, and vnsowne, they will not come : So as it should seeme to bee the *Corne*, that

that qualifieth the Earth, and prepareth it for their Growth.

This Obſeruation, if it holdeth, (as it is very probable,) is of great vſe for the *Meliorating* of *Taſte* in *Fruits*, and *Eſculent Herbes*; And of the *Sent* of *Flowers*. For I doe not doubt, but if the *Figge Tree* doe make the *Rew* more ſtrong, and bitter, (as the Ancients haue noted,) good ſtore of *Rew* planted about the *Fig-Tree*, will make the *Fig* more ſweet. Now the *Taſtes* that doe moſt offend in *Fruits*, and *Herbes*, and *Roots*, are *Bitter*; *Harriſh*; *Sowre*; And *watriſh*, or *Flaſhy*. It were good therefore to make the *Trialls* following. 483

Take *Wormewood*, or *Rew*, and ſet it neere *Lettuce*, or *Coleflory*, or *Artichoake*; And ſee whether the *Lettuce*, or the *Coleflory*, &c. become not the ſweeter. 484

Take a *Seruice-Tree*, or a *Cornelian-Tree*, or an *Elder-Tree*, which wee know haue *Fruits* of harſh and binding Iuyce, and ſet them neare a *Vine*, or *Figge-Tree*, and ſee whether the *Grapes*, or *Figges*, will not be the ſweeter. 485

Take *Cucumbers*, or *Pumpions*, and ſet them (here and there) amongſt *Muske-Melions*, and ſee whether the *Melons* will not be more Winy, and better taſted. Set *Cucumbers* (likewiſe) amongſt *Radiſh*, and ſee whether the *Radiſh* will not be made the more Biting. 486

Take *Sorrell*, and ſet it amongſt *Raſpes*, and ſee whether the *Raſpes* will not bee the ſweeter. 487

Take *Common Briar*, and ſet it amongſt *Violets*, or *Wall-Flowers*, and ſee whether it wil not make the *Violets*, or *Wall-Flowers* ſweeter, and leſſe Earthy in their Smell. So ſet *Lettuce*, or *Cucumbers*, amongſt *Roſemary*, or *Bayes*, and ſee whether the *Roſemary*, or *Bayes*, will not be the more Odorate, or Aromaticall. 488

Contrariwiſe, you muſt take heed, how you ſet *Herbs* together, that draw much the like Iuyce. And therefore I thinke *Roſemary* will leeſe in Sweetneſſe if it be ſet with *Lauender*, or *Bayes*, or the like. But yet, if you wil correct the ſtrength of an Herbe, you ſhall do well to ſet other like Herbs by him, to take him downe; As if you ſhould ſet *Tanſey* by *Angelica*, it may be, the *Angelica* would be the weaker, and fitter for Mixture in Perfume. And if you ſhould ſet *Rew* by *Common Worme-wood*, it may be, the *Wormewood* would turne to be liker *Roman Wormewood*. 489

This *Axiome* is of large extent; And therefore would be ſeuered, and refined by *Triall*. Neither muſt you expect to haue a *Groſſe Difference* by this kinde of Culture, but only *Further Perfection*. 490

Triall would be alſo made in *Herbs Poiſonous*, and *Purgatiue*, whoſe ill Quality (perhaps) may be diſcharged, or attempred, by Setting ſtronger *Poiſons*, or *Purgatiues*, by them. 491

It is reported, that the *Shrub* called *Our Ladies Seale*, (which is a Kind of *Briony*,) and *Coleworts*, ſet neere together, one or both will die. The *Cauſe* is, for that they bee both great Depredatours of the Earth, and one of them ſtarueth the other. The like is ſaid of a *Reed*, and a *Brake*; Both which are ſucculent; And therefore the One deceiueth 492

ceiueth the Other. And the like of *Hemlocke* and *Rew*; Both which draw ſtrong Iuyces.

493 Some of the Ancients, and likewiſe diuers of the Moderne Writers, that haue laboured in *Naturall Magick*, haue noted a *Sympathy*, between the *Sunne*, *Moone*, and ſome Principall *Starres*; And certaine *Herbs*, and *Plants*. And ſo they haue denominated ſome *Herbes Solar*, and ſome *Lunar*; And ſuch like Toyes put into great Words. It is manifeſt, that there are ſome *Flowers*, that haue *Reſpect* to the *Sunne*, in two *Kindes*; The one by *Opening* and *Shutting*; And the other by *Bowing* and *Inclining* the *Head*. For *Mari-golds*, *Tulippa's*, *Pimpernell*, and indeed moſt *Flowers*, doe open or ſpread their leaues abroad, when the *Sunne* ſhineth ſerene and faire: And againe, (in ſome part,) cloſe them, or gather them inward, either towards Night, or when the Skie is ouer caſt. Of this there needeth no ſuch Solemne Reaſon to be aſſigned; As to ſay, that they reioyce at the Preſence of the Sunne; And mourne at the Abſence thereof. For it is Nothing elſe, but a little Loading of the Leaues, and Swelling them at the Bottome, with the Moiſture of the Aire, whereas the drie Aire doth extend them: And they make it a Peece of the wonder, that *Garden Clauer* will hide the *Stalke*, when the *Sunne* ſheweth bright; Which is Nothing, but a full Expanſion of the leaues, For the *Bowing* and *Inclining* the *Head*; it is found in the great *Flower* of the *Sunne*; in *Mari-golds*; *Wart-wort*; *Mallow Flowers*, and others. The *Cauſe* is ſomewhat more Obſcure than the former; But I take it to be no other, but that the Part againſt which the *Sunne* beateth, waxeth more faint and flaccide in the Stalke; And thereby leſſe able to ſupport the *Flower*.

494 What a little *Moiſture* will doe in *Vegetables*, euen though they be dead, and ſeuered from the Earth, appeareth well in the *Experiment* of *Iuglers*. They take the *Beard* of an *Oate*; which (if you marke it well,) is wreathed at the Bottome, and one ſmooth entire Straw at the Top. They take only the Part that is Wreathed, and cut off the other, leauing the *Beard* halfe the Breadth of a finger in length. Then they make a little *Croſſe* of a *Quill*, long-waies, of that Part of the *Quill*, which hath the Pith; And Croſſe-waies of that peece of the *Quill*, without Pith; The whole *Croſſe* being the Breadth of a Finger high. Then they pricke the Bottome where the *Pith* is, and thereinto they put the *Oaten-beard*, leauing halfe of it ſticking forth of the *Quill*: Then they take a little white Box of wood, to deceiue Men, as if ſomewhat in the Box did worke the Feat: In which, with a Pinne, they make a little Hole, enough to take the *Beard*, but not to let the *Croſſe* ſinke downe, but to ſticke. Then likewiſe by way of Impoſture, they make a Queſtion; As, who is the Faireſt Woman in the Company? Or, Who hath a Gloue, or Card? And cauſe another to name diuers Perſons: And vpon euery Naming, they ſticke the *Croſſe* in the Box, hauing firſt put it towards their Mouth, as if they charmed it; And the *Croſſe* ſtirreth not; But when they come to the Perſon that they would take; As they hold the *Croſſe* to their mouth, they

they touch the *Beard* with the Tip of their Tongue, and wet it; And so sticke the *Crosse* in the Box; And then you shall see it turne finely and softly, three or foure Turnes; Which is caused by the vntwining of the *Beard* by the Moisture. You may see it more euidently, if you sticke the Crosse betweene your Fingers, in Stead of the Box; And therefore you may see, that this Motion, which is effected by so little Wet, is stronger than the Closing or Bending of the Head of a *Marigold*.

It is reported by some, that the *Herbe* called *Rosa-Solis*, (whereof they 495
make Strong Waters,) will at the Noone day, when the *Sunne* shineth hot and bright, haue a great Dew vpon it. And therefore, that the right Name is *Ros Solis*: which they impute to a Delight and *Sympathy*, that it hath with the Sunne. Men fauour Wonders. It were good first to bee sure, that the Dew that is found vpon it, bee not the Dew of the Morning Preserued, when the Dew of other *Herbs* is breathed away; for it hath a smooth and thicke Leafe, that doth not discharge the Dew so soone, as other *Herbs* that are more Spungy and Porous. And it may bee *Purslane*, or some other Herbe, doth the like, and is not marked. But if it bee so, that it hath more Dew at Noone, than in the Morning, then sure it seemeth to bee an Exudation of the *Herbe* it selfe. As Plums sweat when they are set into the Ouen: for you will not (I hope) thinke, that it is like *Gedeons Fleece* of *Wooll*, that the *Dew* should fall vpon that, and no where else.

It is certaine, that the *Honey-dewes* are found more vpon *Oake-leaues*, 496
than vpon *Ash*, or *Beech*, or the like; But whether any *Cause* bee, from the *Leafe* it selfe, to concoct the *Dew*; Or whether it bee onely, that the *Leafe* is Close and Smooth; (And therefore drinketh not in the Dew, but preserueth it;) may bee doubted. It would bee well inquired, whether *Manna* the *Drug*, doth fall but vpon certaine *Herbs* or *Leaues* onely. *Flowers* that haue deepe *Sockets*, doe gather in the Bottome, a kinde of *Honey*; As *Honey-Suckles*; (both the *Woodbine*, and the *Trifoile*;) *Lillies*; and the like. And in them certainly the *Flower* beareth part with the *Dew*.

The Experience is, that the *Froth*, which they call *Woodseare*, (being 497
like a kinde of Spittle,) is found but vpon certaine *Herbs*, and those Hot Ones; As *Lauender*, *Lauender-cotton*, *Sage*, *Hissope*, &c. Of the *Cause* of this enquire further; For it seemeth a Secret. There falleth also *Mildew* vpon *Corne*, and smutteth it; But it may be, that the same falleth also vpon other *Herbs*, and is not obserued.

It were good, Triall were made, whether the great Consent be- 498
tweene *Plants* and *Water*, which is a principall Nourishment of them, will make an *Attraction* or Distance, and not at Touch onely. Therefore take a *Vessell*, and in the middle of it make a false Bottome of course Canuasse: Fill it with Earth aboue the Canuasse, and let not the Earth be watred; Then sow some good *Seeds* in that Earth; But vnder the Canuasse, some halfe a foot in the Bottome of the Vessell, lay a great *Spunge*, thorowly wet in water; And let it lye so some ten Dayes; And

see

see whether the *Seeds* will sprout, and the *Earth* become more Moist, and the *Spunge* more dry. The *Experiment* formerly mentioned of the *Cucumber*, creeping to the Pot of Water, is farre stranger than this.

Experiments in Consort, touching the *Making Herbs* and *Fruits Medicinable*.

499 The *Altering* of the *Sent*, *Colour*, or *Taste* of *Fruit*, by *Infusing*, *Mixing*, or *Letting* into the *Barke*, or *Root* of the *Tree*, *Herbe*, or *Flower*, any *Coloured*, *Aromaticall*, or *Medicinall* Substance; are but *Fancies*. The *Cause* is, for that those Things haue passed their Period, and nourish not. And all *Alteration* of Vegetables, in those Qualities, must bee by somewhat that is apt to goe into the Nourishment of the *Plant*. But this is true; that where *Kine* feed vpon *Wilde Garlicke*, their *Milke* tasteth plainely of the *Garlicke*; And the Flesh of *Muttons* is better tasted where the *Sheepe* feed vpon *Wilde Thyme*, and other wholesome *Herbs*. *Galen* also speaketh of the Curing of the *Scirrus* of the *Liuer*, by *Milke* of a *Cow*, that feedeth but vpon certaine *Herbs*; And *Honey* in *Spaine* smelleth (apparently) of the *Rose-Mary*, or *Orenge*, from whence the *Bee* gathereth it: And there is an old Tradition of a *Mayden* that was fed with *Napellus*; (which is counted the strongest Poyson of all *Vegetables*;) which with vse did not hurt the *Maid*, but poisoned some that had Carnall Company with her. So it is obserued by some, that there is a vertuous *Bezoar*, and another without vertue; which appeare to the shew alike; But the Vertuous is taken from the Beast, that feedeth vpon the Mountaines, where there are *Theriacall Herbs*; And that without Vertue, from those that feed in the Valleyes, where no such *Herbs* are. Thus farre I am of Opinion; That as Steeped Wines and Beeres, are very *Medicinall*; and likewise Bread tempered with diuers Powders; So of *Meat* also (as *Flesh*, *Fish*, *Milke*, and *Egges*,) that they may bee made of great vse for *Medicine*, and *Diet*, if the *Beasts*, *Foule*, or *Fish*, be fed with a speciall kinde of food fit for the Disease. It were a dangerous Thing also for secret Empoysonments. But whether it may bee applied vnto *Plants*, and *Herbs*, I doubt more; Because the Nourishment of them is a more common Iuyce; which is hardly capable of any speciall Quality, vntill the *Plant* doe assimilate it.

500 But lest our Incredulity may preiudice any profitable Operations in this kinde, (especially since Many of the Ancients haue set them downe,) We thinke good briefly to propound the foure *Meanes*, which they haue deuised of Making *Plants Medicinable*. The First is by *Slitting* of the *Root*, and *Infusing* into it the *Medicine*; As *Hellebore*, *Opium*, *Scammony*, *Triacle*, &c. And then binding it vp againe. This seemeth to me the least probable; Because the *Root* draweth immediately from the Earth; And so the Nourishment is the more Common, and lesse Qualified: And besides it is a long time in Going vp, ere it come to the *Fruit*. The Second way is, to *Perforate* the *Body* of the *Tree*, and there to *Infuse* the *Medicine*: Which is somewhat better: For if any Vertue be receiued from the *Medicine*, it hath the lesse way, and the lesse time, to goe vp. The Third is, the *Steeping* of the *Seed* or *Kernell* in some *Liquor*, wherein

in the *Medicine* is *Infused*: Which I haue little Opinion of, becauſe the *Seed* (I doubt,) will not draw the Parts of the *Matter*, which haue the *Propriety*: But it will bee farre the more likely, if you mingle the *Medicine* with *Dung*; For that the *Seed* naturally drawing the *Moiſture* of the *Dung*, may call in withall ſome of the *Propriety*. The fourth is, the *Watring* of the *Plant oft*, with an *Infuſion* of the *Medicine*. This, in one reſpect, may haue more force than the reſt; Becauſe the *Medication* is oft renewed; Whereas the reſt are applyed but at one time: And therefore the Vertue may the ſooner vaniſh. But ſtill I doubt, that the *Root* is ſomewhat too ſtubborne to receiue thoſe fine *Impreſſions*; And beſides, (as I ſaid before,) they haue a great *Hill* to goe vp. I iudge therefore the likelieſt way to be the *Perforation of the Body* of the *Tree*, in *ſeuerall Places, one abone the other*; And the *filling* of the *Holes* with *Dung mingled with the Medicine*. And the *Watring* of thoſe *Lumps* of *Dung*, with Squirts of an *Infuſion* of the *Medicine* in *Dunged Water*, once in three or foure Dayes.

NATV-

NATVRALL HISTORIE.

VI. Century.

OVR *Experiments* we take care to be (as we haue often ſaid) either *Experimenta Fructifera*, or *Lucifera*; either of *Vſe*, or of *Diſcouery*: For we hate *Impoſtures*; And deſpiſe *Curioſities*. Yet becauſe we muſt apply our ſelues ſomewhat to others, we will ſet downe ſome *Curioſities* touching *Plants*. Experiments in Conſort touching *Curioſities* about *Fruits* and *Plants*.

It is a *Curioſity*, to haue *ſeuerall Fruits* vpon *one Tree*; And the more, when ſome of them come *Early*, and ſome come *Late*; So that you may haue vpon the ſame *Tree*, Ripe *Fruits* all Sommer. This is eaſily done, by Grafting of ſeuerall *Cions*, vpon ſeuerall Boughes, of a Stock, in a good Ground, plentifully fed. So you may haue all Kindes of *Cherries*, and all kindes of *Plums*, and *Peaches*, and *Apricots*, vpon one *Tree*; But I conceiue the *Diuerſity* of *Fruits* muſt be ſuch, as will graft vpon the ſame Stocke. And therefore I doubt, whether you can haue *Apples*, or *Peares*, or *Orenges*, vpon the ſame Stocke, vpon which you graft *Plummes*. 501

It is a *Curioſity* to haue *Fruits* of *Diuers Shapes*, and *Figures*. This is eaſily performed by Moulding them, when the *Fruit* is young, with Moulds of Earth, or Wood. So you may haue *Cucumbers*, &c. as Long 502

as a Cane; Or as Round as a Spheare; Or formed like a Croſſe. You may haue alſo *Apples*, in the forme of *Peares*, or *Limons*. You may haue alſo *Fruit* in more Accurate Figures; As we ſaid of *Men*, *Beaſts*, or *Birds*, according as you make the Moulds. Wherein you muſt vnderſtand, that you make the Mould big enough, to containe the whole *Fruit*, when it is growne to the greateſt: For elſe you will choake the Spreading of the *Fruit*; Which otherwiſe would ſpread it ſelfe, and fill the Concaue, and ſo be turned into the *Shape* deſired; As it is in Mould-workes of Liquid Things. Some doubt may bee conceiued, that the Keeping of the Sunne from the *Fruit*, may hurt it: But there is ordinarie experience of *Fruit* that groweth Couered. *Quære* alſo, whether ſome ſmall Holes, may not be made in the Wood, to let in the Sunne. And note, that it were beſt to make the Moulds partible, glued, or cemented together, that you may open them, when you take out the *Fruit*.

503 It is a *Curioſity*, to haue *Inſcriptions*, or *Engrauings*, in *Fruit*, or *Trees*. This is eaſily performed, by *Writing* with a *Needle*, or *Bodkin*, or *Knife*, or the like, when the *Fruit*, or *Trees* are young; For as they grow, ſo the Letters will grow more large, and Graphicall.

——Teneriſq; meos incidere Amores
Arboribus, creſcent illæ, creſcetis Amores.

504 You may haue *Trees apparelled* with *Flowers*, or *Herbs*, by *Boring Holes* in the *Bodies* of them, and Putting into them *Earth holpen* with *Mucke*, and *Setting Seeds*, or *Slips*, of *Violets*, *Strawberries*, *Wilde-Thyme*, *Camomill*, and ſuch like in the *Earth*. Wherein they doe but grow, in the *Tree*, as they doe in *Pots*; Though (perhaps) with ſome Feeding from the *Trees*. It would be tried alſo with *Shoots* of *Vines*, and *Roots* of *Red-Roſes*; For it may be, they being of a more Ligneous Nature, will incorporate with the *Tree* it ſelfe.

505 It is an ordinary *Curioſity*, to *Forme Trees* and *Shrubs*, (as *Roſemary*, *Iuniper*, and the like,) into *Sundry Shapes*, which is done by Moulding them within, and cutting them without. But they are but lame Things, being too ſmall to keepe Figure: Great *Caſtles* made of *Trees* vpon Frames of Timber, with Turrets, and Arches, were matters of Magnificence.

506 Amongſt *Curioſities*, I ſhall place *Colouration*, though it be ſomewhat better: For *Beauty* in *Flowers* is their Preheminence. It is obſerued by ſome, that *Gilly-Flowers*, *Sweet Williams*, *Violets*, that are *Coloured*, if they be neglected, and neither Watred, nor New Moulded, nor Tranſplanted, will turne *White*. And it is probable, that the *White* with much culture, may turne *Coloured*. For this is certaine, that the *White Colour* commeth of Scarcity of Nouriſhment; Except in Flowers that are onely *White*, and admit no other *Colours*.

507 It is good therefore, to ſee what *Natures* doe accompany what *Colours*; For by that you ſhall haue Light, how to induce *Colours*, by Producing thoſe *Natures*. *Whites* are more Inodorate, (for the moſt part,) than

than *Flowers* of the same kinde *Coloured*; As is found in *Single White Violets*, *White-Roses*, *White Gilly-Flowers*, *White Stock-Gilly Flowers*, &c. We finde also, that *Blossomes* of *Trees*, that are *White*, are commonly Inodorate; As *Cherries*, *Peares*, *Plummes*; Whereas those of *Apples*, *Crabs*, *Almonds*, and *Peaches*, are Blushy, and smell sweet. The *Cause* is, for that the Substance that maketh the *Flower*, is of the thinnest and finest of the *Plant*; Which also maketh *Flowers* to bee of so dainty *Colours*. And if it bee too Sparing, and Thinne, it attaineth no Strength of Odour; Except it be in such *Plants*, as are very Succulent; Whereby they need rather to be scanted in their Nourishment, than repleni shed, to haue them sweet. As we see in *White Satyrion*, which is of a Dainty Smell; And in *Beane-Flowers*, &c. And againe, if the *Plant* bee of Nature, to put forth *White-Flowers* onely, and those not thinne, or dry, they are commonly of rancke and fulsome Smell; As *May-Flowers*, and *White Lillies*.

Contrariwise, in *Berries*, the *White* is commonly more Delicate, and Sweet in Taste, than the *Coloured*; As we see in *White Grapes*; In *White Raspes*; In *White Strawberries*; In *White Currans*, &c. The *Cause* is, for that the *Coloured* are more iuyced, and courser iuyced; And therefore not so well and equally Concocted; But the *White* are better proportioned, to the Disgestion of the *Plant*. 508

But in *Fruits*, the *White* commonly is meaner; As in *Peare-plums*, *Damasins*, &c. And the Choicest *Plummes* are Blacke; The *Mulberry*, (which though they call it a *Berry*, is a *Fruit*,) is better the *Blacke*, than the *White*. The *Harueſt White-Plumme*, is a base *Plumme*; And the *Verdoccio* and *White Date-Plumme*, are no very good *Plummes*. The *Cause* is, for that they are all Ouer-watry: Whereas an higher Concoction is required for Sweetnesse, or Pleasure of Taste; And therefore all your dainty *Plummes*, are a little dry, and come from the Stone; As the *Muscle-Plumme*, the *Damasin-Plumme*, the *Peach*, the *Apricot*, &c. Yet some *Fruits*, which grow not to bee *Blacke*, are of the Nature of *Berries*, sweetest such as are Paler; As the *Cœur-Cherry*, which inclineth more to *White*, is sweeter than the *Red*; But the *Egriot* is more sowre. 509

Take *Gilly-Flower Seed*, of one kinde of *Gilly-Flower*: (As of the *Cloue-Gilly-Flower*, which is the most Common;) And sow it; And there will come vp *Gilly-Flowers*, some of one *Colour*, and some of another, casually, as the *Seed* meeteth with Nourishment in the Earth; So that the *Gardiners* finde, that they may haue two or three *Roots* amongst an hundred, that are rare, and of great Price: As *Purple*, *Carnation* of seuerall *Stripes*; The *Cause* is (no doubt) that in *Earth*, though it be contiguous, and in one Bed, there are very seuerall *Iuyces*; And as the *Seed* doth casually meet with them, so it commeth forth. And it is noted especially, that those which doe come vp *Purple*, doe alwaies come vp Single; The *Iuyce*, as it seemeth, not being able to suffice a *Succulent Colour*, and a *Double Leafe*. This *Experiment* of seuerall *Co-* 510

lours, comming vp from one *Seed*, would bee tried alſo in *Larkes-Foot*, *Monkes-Hood*, *Poppy*, and *Hollyoke*.

511 Few *Fruits* are coloured *Red* within; The *Queene-Apple* is; And another *Apple*, called the *Roſe-Apple*, *Mulberries* likewiſe; and *Grapes*, though moſt toward the Skinne. There is a *Peach* alſo, that hath a Circle of *Red* towards the Stone: And the *Egriot-Cherry* is ſomewhat *Red* within; But no *Peare*, nor *Warden*, nor *Plumme*, nor *Apricot*, although they haue (many times) *Red* ſides, are Coloured *Red* within. The *Cauſe* may be enquired.

512 The Generall *Colour* of *Plants* is *Greene*; which is a *Colour* that no *Flower* is of. There a *Greeniſh Prime-Roſe*, but it is *Pale* and ſcarce a *Greene*; The *Leaues* of ſome *Trees* turne a little *Murry*, or *Reddiſh*; And they be commonly *Young Leaues* that doe ſo; As it is in *Oakes*, and *Vines*, and *Haſle*. *Leaues* rot into a *Yellow*; And ſome *Hollies* haue part of their *Leaues Yellow*, that are, (to all ſeeming,) as Freſh and Shining, as the *Greene*. I ſuppoſe alſo, that *Yellow* is a leſſe Succulent *Colour*, than *Greene*; And a degree neerer *White*. For it hath beene noted, that thoſe *Yellow Leaues* of *Holly* ſtand euer towards the *North*, or *North-Eaſt*. Some *Roots* are *Yellow*, as *Carrets*; And ſome *Plants Blood-Red*, Stalke and Leafe, and all; as *Amaranthus*. Some *Herbs* incline to *Purple*, and *Red*; As a Kinde of *Sage* doth, and a Kinde of *Mint*, and *Roſa Solis*, &c. And ſome haue *White Leaues*, as another Kinde of *Sage*, and another Kinde of *Mint*; But *Azure*, and a *Faire Purple*, are neuer found in *Leaues*. This ſheweth, that *Flowers* are made of a Refined Iuyce, of the Earth; And ſo are *Fruits*: But *Leaues* of a more Courſe, and Common.

513 It is a *Curioſity* alſo to make *Flowers Double*; Which is effected by *Often Remouing* them into *New Earth*; As on the contrary Part, *Double Flowers*, by neglecting, and not Remouing, proue *Single*. And the Way to doe it ſpeedily, is to ſow or ſet *Seeds*, or *Slips* of *Flowers*; And as ſoone as they come vp, to remoue them into New Ground, that is good. Enquire alſo, Whether *Inoculating* of *Flowers*, (as *Stock-Gilly-Flowers*, *Roſes*, *Muſk-Roſes*, &c.) doth not make them *Double*. There is a *Cherry-Tree*, that hath *Double Bloſſomes*; But that *Tree* beareth no *Fruit*; And, it may be, that the ſame Meanes, which applied to the *Tree*, doth extremely accelerate the Sap to riſe, and breake forth; Would make the *Tree* ſpend it ſelfe in *Flowers*, and thoſe to become *Double*; Which were a great pleaſure to ſee; Eſpecially in *Apple-Trees*, *Peach-Trees*, and *Almond-Trees*, that haue *Bloſſomes Bluſh-Coloured*.

514 The *Making* of *Fruits*, without *Core* or *Stone*, is likwiſe a *Curioſity*; And ſomewhat better: Becauſe whatſoeuer maketh them ſo, is like to make them more Tender and Delicate. If a *Cions* or *Shoot*, fit to be ſet in the Ground, haue the *Pith* finely taken forth, (and not altogether, but ſome of it left, the better to ſaue the life,) it will beare a *Fruit* with little, or no *Core*, or *Stone*. And the like is ſaid to bee, of diuiding a *Quick-Tree* downe to the Ground, and Taking out the *Pith*, and then binding it vp againe.

It is reported alſo, that a *Citron* grafted vpon a *Quince*, will haue ſmal or no *Seeds*; And it is very probable, that any *Sowre Fruit*, grafted vpon a *Stock*, that beareth a *Sweeter Fruit*, may both make the *Fruit* ſweeter, and more void of the harſh matter of *Kernels* or *Seeds*. 551

It is reported, that not onely the *Taking out* of the *Pith*, but the *Stopping* of the *Iuyce* of the *Pith*, from Riſing in the Middeſt, and *Turning* it to riſe on the Outſide, will make the *Fruit* without *Core*, or *Stone*; As if you ſhould bore a *Tree* cleane thorow, and put a wedge in. It is true, there is ſome Affinity betweene the *Pith* and the *Kernell*, becauſe they are both of a harſh Subſtance, and both placed in the Middeſt. 516

It is reported, that *Trees watered* perpetually with *Warme Water*, will make a *Fruit*, with little or no *Core*, or *Stone*: And the Rule is generall, that whatſoeuer will make a *Wild Tree* a *Garden-Tree*, will make a *Garden-Tree* to haue leſſe *Core*, or *Stone*. 517

THe Rule is certaine, that *Plants* for want of Culture, *degenerate* to be baſer in the ſame Kind; And ſometimes, ſo farre, as to change into another Kinde. 1. The *Standing long*, and not being *Remoued*, maketh them *degenerate*. 2. *Drought*, vnleſſe the Earth of it ſelfe be moiſt, doth the like. 3. So doth *Remouing into worſe Earth*, or *Forbearing to Compoſt the Earth*; As we ſee, that *Water-Mint* turneth into *Field-Mint*; And the *Colewort* into *Rape* by neglect, &c. Experiments in Conſort touching the *Degenerating* of *Plants*; And of the *Tranſmutation* of them, one into another. 518

Whatſoeuer *Fruit* vſeth to be ſet vpon a *Root* or a *Slip*, if it be *ſowne*, will *degenerate*. *Grapes ſowne*; *Figs*, *Almonds*, *Pomgranate Kernels ſowne*; make the *Fruits degenerate*, and become Wilde. And againe, Moſt of thoſe *Fruits* that vſe to bee *grafted*, if they be ſet of *Kernels*, or *Stones*, *degenerate*. It is true, that *Peaches* (as hath beene touched before) doe better vpon *Stones Set*, than vpon *Grafting*; And the Rule of Exception ſhould ſeeme to be this; That whatſoeuer *Plant* requireth much Moiſture, proſpereth better vpon the *Stone*, or *Kernell*, than vpon the *Graft*. For the Stocke, though it giueth a finer Nouriſhment, yet it giueth a ſcanter, than the earth at large. 519

Seeds, if they be very *Old*, and yet haue ſtrength enough to bring forth a *Plant*, make the *Plant degenerate*. And therefore skilfull Gardiners make triall of the *Seeds*, before they buy them, whether they be good or no, by putting them into Water gently Boyled; And if they bee good, they will ſprout within Halfe an Houre. 520

It is ſtrange which is reported, that *Baſil* too much expoſed to the *Sunne*, doth turne into *Wilde Thyme*: Although thoſe two *Herbs* ſeeme to haue ſmall Affinity; but *Baſil* is almoſt the only Hot *Herbe*, that hath Fat and Succulent *Leaues*; Which Oyline ſſe, if it be drawn forth by the Sunne, it is like it will make a very great Change. 521

There is an old Tradition, that *Boughs of Oake*, put into the Earth, will put forth *Wilde Vines*: Which if it be true (no doubt) it is not the *Oake* that turneth into a *Vine*, but the *Oake-Bough* Putrifying, qualifieth the Earth, to put forth a *Vine* of it ſelfe. 522

523 It is not impossible, and I haue heard it verified, that vpon *Cutting downe* of an Old *Timber Tree*, the *Stub* hath put out sometimes a *Tree* of another Kinde; As that *Beech* hath put forth *Birch*; Which, if it bee true, the *Cause* may be, for that the old *Stub* is too scant of Iuyce, to put forth the former *Tree*; And therefore putteth forth a *Tree* of a smaller kinde, that needeth lesse Nourishment.

524 There is an Opinion in the Countrey, that if the same *Ground* be *ofte sowne*, with the *Graine* that *grew vpon it*, it will in the end, grow to be of a baser kinde.

525 It is certaine, that in very *sterile Teeres*, *Corne sowne* will grow to *another Kinde*.

Grandia sæpè quibus mandauimus Hordea Sulcis,
Infœlix Lolium, & steriles dominantur Auenæ.

And generally it is a Rule, that *Plants*, that are brought forth by *Culture* as *Corne*, will sooner change into other *Species*, than those that come of themselues: For that *Culture* giueth but an Aduentitious Nature, which is more easily put off.

This worke of the *Transmutation* of *Plants*, one into another, is *inter Magnalia Naturæ*: For the *Transmutation* of *Species* is, in the vulgar Philosophy, pronounced Impossible: And certainly, it is a thing of difficulty, and requireth deepe Search into Nature: But seeing there appeare some manifest *Instances* of it, the Opinion of Impossibility is to bee reiected, And the Meanes thereof to bee found out. Wee see, that in *Liuing Creatures*, that come of *Putrefaction*, there is much *Transmutation*, of one into another; As *Catterpillars* turne into *Flies*, &c. And it should seeme probable, that whatsoeuer *Creature*, hauing life, is generated without *Seed*, that *Creature* will change out of one *Species* into another. For it is the *Seed*, and the Nature of it, which locketh and boundeth in the *Creature*, that it doth not expatiate. So as wee may well conclude, that seeing the Earth, of it selfe, doth put forth *Plants*, without *Seed*, therefore *Plants* may well haue a *Transmigration* of *Species*. Wherefore wanting *Instances*, which doe occurre, wee shall giue Directions of the most likely *Trialls*: And generally, wee would not haue those, that read this our Worke of *Sylua Syluarum*, account it strange, or thinke that it is an Ouer-Haste, that wee haue set downe Particulars vntried; For contrariwise, in our owne Estimation, wee account such Particulars, more worthy, than those that are already

ready tried and knowne. For these Later must be taken as you finde them; But the Other doe levell Point blanke at the *Inventing*, of *Causes*, and *Axiomes*.

First therefore you must make account, that if you will haue one *Plant* change into another, you must haue the *Nourishment* ouer-rule the *Seed*, And therefore you are to practice it by *Nourishments* as contrary as may be, to the *Nature* of the *Herbe*, So nevertheless as the *Herb* may grow; And likewise with *Seeds* that are of the Weakest Sort, and haue least Vigour. You shall doe well therefore, to take *Marsh Herbs*, and Plant them vpon Tops of Hills, ond Champaignes; And such *Plants* as require much Moisture, vpon Sandy and very dry Grounds. As for Example *Marsh-Mallowes*, and *Sedge*, vpon Hills; *Cucumber* and *Lettuce-Seeds*, and *Colewo. ts*, vpon a *Sandy Plot*: So contrariwise plant *Bushes*, *Heath*, *Ling*, and *Brakes*, vpon a *Wet* or *Marsh Ground*. This I conceiue also, that all *Esculent* and *Garden-Herbs*, set vpon the Tops of Hills, will proue more *Medicinall*, though lesse *Esculent*, than they were before. And it may be likewise, some *Wilde-Herbs* you may make *Sallet-Herbs*. This is the first Rule for *Transmutation* of *Plants*. 526

The second Rule shall be to bury some few *Seeds*, of the *Herbe* you would change, amongst other *Seeds*; And then you shall see, whether the Iuyce of those other *Seeds*, doe not so qualifie the Earth, as it will alter the *Seed*, whereupon you worke. As for Example; Put *Parsly-Seed* amongst *Onion-Seed*; Or *Lettuce-Seed* amongst *Parsly-Seed*; Or *Basill-Seed* amongst *Thyme-Seed*; And see the Change of Taste, or otherwise. But you shall doe well, to put the *Seed* you would change, into a little linnen Cloth, that it mingle not with the forraine *Seed*. 527

The third Rule shall be, the *Making* of some *Medley* or *Mixture* of *Earth*, with some other *Plants bruised*, or *Shauen*, either in *Leafe* or *Root*: As for example, make *Earth* with a *Mixture* of *Colewort-Leaues*, stamped, and set in it *Artichoakes*, or *Parsnips*; So take *Earth* made with *Maioram*, or *Origanum*, or *Wilde-Thyme*, bruised, or stamped, and set in it *Fennell-Seed*, &c. In which Operation, the Processe of Nature still will be, (as I conceiue) not that the *Herbe* you worke vpon, should draw the Iuyce of the Forraine *Herbe*; (For that Opinion we haue formerly reiected;) But that there will be a New Confection of Mould, which perhaps will alter the *Seed*, and yet not to the kinde of the former *Herbe*. 528

The fourth Rule shall be, to marke what *Herbs*, *some Earths doe put forth of themselues*, And to take that *Earth*, and to *Pot* it, or to *Vessell* it; And in that to set the *Seed* you would change: As for example, take from vnder Walls, or the like, where *Nettles* put forth in abundance, the Earth which you shall there finde, without any *String*, or *Root*, of the *Nettles*; And Pot that *Earth*, and set in it *Stock-gilly-flowres*, or *Wall-flowres*, &c. Or sow in the *Seeds* of them; And see what the Euent will be: Or take *Earth*, that you haue prepared to put forth *Mush-* 529

romes.

romes, of it ſelfe, (whereof you ſhall find ſome *Inſtances* following;) And ſow in it *Purſlane-Seed*, or *Lettuce-Seed*; For in theſe *Experiments*, it is likely enough, that the earth being accuſtomed to ſend forth one Kinde of Nouriſhment, will alter the new *Seed*.

530 The fifth Rule ſhall be, to make the *Herbe grow contrary to his Nature*; As to make *Ground-Herbs* riſe in *Height*: As for example; Carry *Camomill*, or *wilde-Thyme*, or the *Greene Strawberry*, vpon Stickes, as you doe *Hops* vpon Poles; and ſee what the Euent will be.

531 The ſixth Rule ſhall be, to make *Plants grow out of the Sunne, or Open Aire*; For that is a great Mutation in Nature; And may induce a Change in the *Seed*: As barrell vp *Earth*, and ſow ſome *Seed* in it, and put it in the Bottome of a Pond; Or put it in ſome great hollow *Tree*; Trie alſo the Sowing of *Seeds*, in the Bottomes of Caues; And Pots with *Seeds* ſowne, hanged vp in Wells, ſome diſtance from the Water, and ſee what the Euent will be.

Experiments in Conſort, touching the *Procerity*, and *Lowneſſe*, and *Artificial dwarfing* of *Trees*.

532 IT is certaine, that *Timber-Trees* in *Coppice woods*, grow more vpright, and more free from Vnder-Boughes, than thoſe that ſtand in the *Fields*: The *Cauſe* whereof is, for that *Plants* haue a Naturall Motion, to get to the Sunne; And beſides, they are not glutted with too much Nouriſhment; For that the *Coppice* ſhareth with them; And Repletion euer hindreth Stature; Laſtly, they are kept warme; And that euer in *Plants* helpeth Mounting.

533 *Trees*, that are, of themſelues, full of *Heat*, (which *Heat* appeareth by their *Inflammable Gummes*,) as *Firres*, and *Pines*, mount of themſelues in Heigth without Side-Boughes, till they come towards the Top. The *Cauſe* is, partly Heat; And partly Tenuity of Iuyce; Both which ſend the Sap vpwards. As for *Iuniper*, it is but a *Shrub*, and groweth not big enough in Body, to maintaine a tall *Tree*.

534 It is reported, that a Good Strong *Canuas*, ſpread ouer a *Tree* grafted low, ſoone after it putteth forth, will *dwarfe* it, and make it ſpread. The *Cauſe* is plaine; For that all things that grow, will grow as they finde Roome.

535 *Trees* are generally ſet of *Roots*, or *Kernels*; But if you ſet them of *Slips* (as of ſome *Trees* you may, by name the *Mulberry*,) ſome of the *Slips* will take; And thoſe that take, (as is reported,) will be *Dwarfe-Trees*. The *Cauſe* is, for that a *Slip* draweth Nouriſhment more weakly, than either a *Root*, or *Kernell*.

536 All *Plants*, that put forth their *Sap* haſtily, haue their Bodies not proportionable to their Length; And therefore they are *Winders*, and *Creepers*; As *Iuy*, *Briony*, *Hops*, *Woodbine*: Whereas *Dwarfing* requireth a ſlow Putting forth, and leſſe Vigour of Mounting.

Experiments in Conſort touching the

The *Scripture* ſaith; that *Salomon* wrote a *Naturall Hiſtory*, from the *Cedar* of *Libanus*, to the *Moſſe growing vpon the Wall*: For

For ſo the beſt *Tranſlations* haue it. And it is true that *Moſſe*, is but the *Rudiment* of a *Plant*; And (as it were) the *Mould* of *Earth*, of *Barke*.

Rudiments of Plants, and of the *Excreſcenſes* of *Plants*, or *Super-Plants*.

537 *Moſſe* groweth chiefly vpon *Ridges* of *Houſes*, tiled or thatched; And vpon the *Creſts* of *Walls*. And that *Moſſe* is of a lightſome, and pleaſant Greene, The Growing vpon *Slopes* is cauſed, for that *Moſſe*, as on the one ſide it commeth of Moiſture and Water, ſo on the other ſide the *Water* muſt but Slide, and not Stand or Poole. And the *Growing* vpon *Tiles*, or *walls*, &c. is cauſed, for that thoſe dried Earths, hauing not Moiſture ſufficient to put forth a *Plant*, doe practiſe *Germination* by Putting forth *Moſſe*; Though when by Age, or otherwiſe, they grow to relent and reſolue, they ſometimes put forth *Plants*; As *Wall-Flowers*. And almoſt all *Moſſe* hath here and there little Stalkes, beſides the low Thrumme.

538 *Moſſe* groweth vpon *Alleyes*, eſpecially ſuch as lye Cold, and vpon the North; As in diuers Tarraſſes: And againe, if they be much trodden; Or if they were, at the firſt, grauelled; for whereſoeuer *Plants* are kept downe, the Earth putteth forth *Moſſe*.

539 *Old Ground*, that hath beene long vnbroken vp, gathereth *Moſſe*: And therefore Husbandmen vſe to cure their *Paſture Grounds*, when they grow to *Moſſe*, by Tilling them for a yeare, or two: Which alſo dependeth vpon the ſame *Cauſe*; For that, the more Sparing, and Staruing Iuyce of the Earth, inſufficient for *Plants*, doth breed *Moſſe*.

540 *Old Trees*, are more *Moſſie*, (farre) than *Young*; For that the Sap is not ſo francke as to riſe all to the Boughes, but tireth by the way, and putteth out *Moſſe*.

541 *Fountaines* haue *Moſſe* growing vpon the *Ground* about them;

Muſcoſi Fontes; ——————

The *Cauſe* is, for that the *Fountaines* draine the *Water* from the *Ground Adiacent*, and leaue but ſufficient Moiſture to breed *Moſſe*: And beſides, the *Coldneſſe* of the *water*, conduceth to the ſame.

542 The *Moſſe* of *Trees*, is a kinde of *Haire*; For it is the Iuyce of the *Tree*, that is Excerned, and doth not Aſſimilate. And vpon great *Trees* the *Moſſe* gathereth a Figure, like a *Leafe*.

543 The *Moiſter Sort* of *Trees* yeeld little *Moſſe*; As wee ſee in *Aſpes*, *Poplars*, *Willowes*, *Beeches*, &c. Which is partly cauſed, for the reaſon that hath beene giuen, of the francke Putting vp of the *Sap* into the *Boughes*; And partly, for that the *Barkes* of thoſe *Trees*, are more Cloſe and Smooth, than thoſe of *Oakes*, and *Aſhes*; Whereby the *Moſſe* can the hardlier iſſue out.

544 In *Clay-Grounds*, all *Fruit-Trees* grow full of *Moſſe*, both vpon *Body* and *Boughes*, Which is cauſed, partly by the *Coldneſſe* of the *Ground*, whereby the *Plants* nouriſh leſſe; And partly by the *Toughneſſe* of the *Earth*, whereby the *Sap* is ſhut in, and cannot get vp, to ſpread ſo francke ly, as it ſhould doe.

We

545 We haue ſaid heretofore, that if *Trees* be *Hide-bound*, they wax leſſe Fruitfull, and gather *Moſſe:* And that they are holpen by *Hacking*, &c. And therefore by the reaſon of Contraries, if *Trees* bee bound in with *Cords*, or ſome Outward *Bands*, they will put forth more *Moſſe:* Which (I thinke) happeneth to *Trees* that ſtand Bleake, and vpon the Cold Winds. It would alſo be tried, whether if you couer a *Tree*, ſomewhat thicke vpon the top, after his Powling, it will not gather more *Moſſe*. I thinke alſo, the *Watring* of *Trees* with *Cold Fountaine-Water*, will make them grow full of *Moſſe*.

546 There is a *Moſſe* the *Perfumers* haue, which commeth out of *Apple-Trees*, that hath an Excellent Sent. *Quære* particularly for the *Manner* of the *Growth*, and the *Nature* of it. And for this *Experiments* ſake, being a Thing of Price, I haue ſet downe the laſt *Experiments*, how to multiply, and call on *Moſſes*.

Next vnto *Moſſe*, I will ſpeake of *Muſhromes*; Which are likewiſe an *Vnperfect Plant*. Theſe *Muſhromes* haue two ſtrange *Properties*; The One, that they yeeld ſo *Delicious* a *Meat*; The other, that they *come vp* ſo *haſtily*; As in a *Night*; And yet they are *Vnſowne*. And therefore, ſuch as are Vp-ſtarts in State, they call, in reproach, *Muſhromes*. It muſt needs be therefore, that they bee made of much *Moiſture*; And that *Moiſture* Fat, Groſſe, and yet ſomewhat Concocted. And (indeed) we finde that *Muſhromes* cauſe the *Accident*, which we call *Incubus*, or the *Mare*, in the *Stomacke*. And therefore the *Surfet* of them may Suffocate, and Empoyſon. And this ſheweth, that they are Windy; And that Windineſſe is Groſſe, and Swelling; Not Sharpe, or Griping. And vpon the ſame reaſon *Muſhromes* are a venereous Meat.

547 It is reported, that the *Barke* of *White*, or *Red Poplar*, (which are of the Moiſteſt of *Trees*,) cut ſmall, and caſt into *Furrowes* well dunged, will cauſe the Ground to put forth *Muſhromes*, at all *Seaſons* of the *Yeare*, fit to be eaten. Some adde to the Mixture *Leauen* of *Bread*, reſolued in *Water*.

548 It is reported, that if a *Hilly-Field*, where the *Stubble* is ſtanding, bee ſet on *Fire*, in a *Showrie Seaſon*, it will put forth great Store of *Muſhromes*.

549 It is reported that *Harts-Horne*, *Shauen*, or in *Small Peeces*, mixed with *Dung*, and *Watred*, putteth vp *Muſhromes*. and we know *Harts-Horne* is of a Fat and Clammie Subſtance: And it may be *Oxe-Horne* would doe the like.

550 It hath beene reported, though it be ſcarce credible, that *Iuy* hath growne out of a *Stags-Horne*; Which they ſuppoſe, did rather come from

from a *Confrication* of the *Horne* vpon the *Iuy*, than from the *Horne* it selfe. There is not knowne any Substance, but *Earth*, and the *Procedures* of *Earth*, (as *Tile*, *Stone*, &c.) that yeeldeth any *Mosse*, or *Herby Substance*. There may be triall made of some *Seeds*, as that of *Fennell-Seed*, *Mustard-Seed*, and *Rape-Seed*, put into some little *Holes*, made in the *Hornes* of *Stags*, or *Oxen*, to see if they will grow.

551 There is also another *Vnperfect Plant*, that (in shew) is like a great *Mushrome*: And it is sometimes as broad as ones Hat; Which they call a *Toads-Stoole*: But it is not Eticulent; And it groweth (commonly) by a dead Stub of a *Tree*; And likewise about the *Roots* of *Rotten Trees*: And therefore seemeth to take his Iuyce from *Wood Putrified*. Which sheweth, by the way, that *Wood Putrified* yeeldeth a franke *Moysture*.

552 There is a *Cake*, that groweth vpon the side of a *Dead Tree*, that hath gotten no Name, but it is large, and of a Chesnut Colour, and hard, and pithy, Whereby it should seeme, that euen *Dead Trees* forget not their putting forth; No more than the *Carcasses* of *Mens Bodies*, that put forth *Haire*, and *Nailes*, for a Time.

553 There is a *Cod*, or *Bigge*, that groweth commonly in the *Fields*; That at the first is hard like a *Tennis-Ball*, and white; And after groweth of a *Mushrome Colour*, and full of light *Dust* vpon the Breaking. And is thought to be dangerous for the *Eyes*, if the *Powder* get into them; And to bee good for *Kibes*. Belike it hath a *Corrosiue*, and *Fretting Nature*.

554 There is an *Herbe* called *Iewes-Eare*, that groweth vpon the *Roots*, and *Lower Parts* of the *Bodies* of *Trees*; Especially of *Elders*, and sometimes *Ashes*. It hath a strange Property; For in *Warme-water*, it swelleth, and openeth extremely. It is not greene, but of a duskie browne Colour. And it is vsed for *Squinancies*, and *Inflammations* in the *Throat*; Whereby it seemeth to haue a Mollifying, and Lenifying Vertue.

555 There is a Kinde of *Spongie Excrescence*, which groweth chiefly vpon the *Roots* of the *Lafer-Tree*; And sometimes vpon *Cedar*, and other *Trees*. It is very White, and Light, and Friable: Which we call *Agaricke*. It is famous in *Physicke* for the *Purging* of *Tough flegme*. And it is also an excellent *Opener* for the *Liuer*: But Offensiue to the *Stomacke*, And in *Taste* it is, at the first, *Sweet*, and after *Bitter*.

556 We finde no *Super-Plant*, that is a Formed *Plant*, but *Misseltoe*. They haue an idle Tradition, that there is a *Bird*, called a *Missel-bird*, that feedeth vpon a *Seed*, which many times she cannot digest, and so expelleth it whole with her Excrement: which falling vpon a *Bough* of a *Tree* that hath some Rif, putteth forth the *Misseltoe*. But this is a Fable: For it is not probable, that *Birds* should feed vpon that they cannot digest. But allow that, yet it cannot be for other Reasons: For first, it is found but vpon certaine *Trees*; And those *Trees* beare no such *Fruit*, as may allure that *Bird* to sit, and feed vpon them. It may be, that *Bird* feedeth vpon the *Misseltoe Berries*, and so is often found there; Which may haue giuen occasion to the Tale. But that which maketh an End of the Question

ſtion, is, that *Miſſeltoe* hath beene found to put forth vnder the *Boughes*, and not (only) aboue the *Boughes*: So it cannot be any Thing that falleth vpon the *Bough*. *Miſſeltoe* groweth chiefly vpon *Crab-Trees*, *Apple-Trees*, ſometimes vpon *Haſles*; And rarely vpon *Oakes*; The *Miſſeltoe* whereof is counted very *Medicinall*. It is euer greene, Winter and Summer; And beareth a *white Gliſtering Berry*: And it is a *Plant* vtterly differing from the *Plant*, vpon which it groweth. Two things therefore maybe certainly ſet downe: Firſt, that *Super-fatation* muſt be by *Abundance* of *Sap*, in the *Bough* that putteth it forth: Secondly, that that *Sap* muſt be ſuch, as the *Tree* doth excerne, and cannot aſſimilate; For elſe it would goe into a *Bough*; And beſides, it ſeemeth to bee more Fat and Vnctuous, than the Ordinary *Sap* of the *Tree*; Both by the *Berry*, which is Clammie; And by that it continueth greene, Winter and Summer, which the *Tree* doth not.

557 This *Experiment* of *Miſſeltoe* may giue Light to other Practiſes. Therefore Triall would bee made, by ripping of the *Bough* of a *Crab-Tree* in the *Barke*; And *watring* of the wound euery Day, with *Warme Water Dunged*, to ſee if it would bring forth *Miſſeltoe*, or any ſuch like Thing. But it were yet more likely to trie it, with ſome other *watring*, or *Anointing*, that were not ſo Naturall to the *Tree*, as *water* is; As *Oyle*, or *Barme* of *Drinke*, &c. So they bee ſuch Things as kill not the *Bough*.

558 It were good to trie, what *Plants* would put forth, if they bee forbidden to put forth their *Naturall Boughes*: Poll therefore a *Tree*, and couer it, ſome thickneſſe, with *Clay* on the Top; And ſee what it will put forth. I ſuppoſe it will put forth *Roots*; For ſo will a *Cions*, being turned downe into *Clay*: Therefore, in this *Experiment* alſo, the *Tree* would be cloſed with ſomewhat, that is not ſo Naturall to the *Plant*, as *Clay* is. Trie it with *Leather*, or *Cloth*, or *Painting*, ſo it be not hurtfull to the *Tree*. And it is certaine, that a *Brake* hath beene knowne to grow out of a *Pollard*.

559 A man may count the *Prickles* of *Trees* to be a kinde of *Excreſcence*; For they will neuer be *Boughes*, nor beare *Leaues*. The *Plants* that haue *Prickles*, are *Thornes*, blacke and white; *Brier*; *Roſe*; *Limon-Trees*; *Crab-Trees*; *Gooſe-Berry*; *Berbery*; Theſe haue it in the *Bough*; The *Plants* that haue *Prickles* in the *Leafe*, are; *Holly*; *Iuniper*; *Whin-buſh*; *Thiſtle*; *Nettles* alſo haue a ſmall venomous *Prickle*; So hath *Burrage*, but harmeleſſe. The *Cauſe* muſt be *Haſty Putting forth*; *Want* of *Moiſture*; And the *Cloſe neſſe* of the *Barke*; For the *Haſte* of the *Spirit to put forth*, and the *Want* of *Nouriſhment* to put forth a *Bough*, and the *Cloſeneſſe* of the *Barke*, cauſe *Prickles* in *Boughes*; And therefore they are euer like a *Pyramis*, for that the *Moiſture* ſpendeth after a little Putting forth. And for *Prickles* in *Leaues*, they come alſo of *Putting forth more Iuyce* into the *Leafe*, than can ſpread in the *Leafe* ſmooth; And therefore the *Leaues* otherwiſe are *Rough*, as *Borrage* and *Nettles* are. As for the *Leaues* of *Holly*, they are *Smooth*, but neuer *Plaine*, but as it were with *Folds* for the ſame *Cauſe*.

There

There bee alſo *Plants*, that though they haue no *Prickles*, yet they haue a kinde of *Downy* or *Veluet Rine*, vpon their *Leaues*; As *Roſe-Campion*, *Stock-Gilly-Flowers*, *Colts-Foot*; which *Downe*, or *Nap* commeth of a *Subtill Spirit*, in a *Soft* or *Fat Subſtance*. For it is certaine, that both *Stock-Gilly-Flowers*, and *Roſe-Campions*, ſtamped, haue beene applyed, (with ſucceſſe) to the *Wreſts* of thoſe that haue had *Tertian*, or *Quartan Agues*; And the *Vapour* of *Colts-Foot* hath a Sanatiue vertue, towards the *Lungs*; And the *Leafe* alſo is *Healing* in *Surgery*. 560

Another Kinde of *Excreſcenſe* is an *Exudation* of *Plants*, ioyned with *Putrefaction*; As wee ſee in *Oake-Apples*, which are found chiefly vpon the *Leaues* of *Oakes*; And the like vpon *Willowes*: And Countrey People haue a kinde of *Prediction*, that if the *Oake-Apple*, broken, be full of *Wormes*, it is a Signe of a *Peſtilent Yeere*; Which is a likely Thing, becauſe they grow of Corruption. 561

There is alſo vpon *Sweet*, or other *Brier*, a fine *Tuft*, or *Bruſh* of *Moſſe*, of diuers Colours; Which if you cut, you ſhall euer finde full of little white *Wormes*. 562

Experiments in Conſort touching the *Producing* of *Perfect Plants* without *Seed*.

IT is certaine, that *Earth*, taken out of the *Foundations* of *Vaults* and *Houſes*, and *Bottomes* of *Wells*, and then put into *Pots*, will put forth Sundry Kinds of *Herbs*: But ſome *Time* is required, for the *Germination*; for if it be taken, but from a *Fathome* deepe; it will put forth the *Firſt Yeere* If much deeper, not till after a *Yeere*, or *Two*. 563

The *Nature* of the *Plants* growing out of *Earth* ſo taken vp, doth follow the *Nature* of the *Mould* it ſelfe; As if the *Mould* be *Soft*, and Fine, it putteth forth Soft *Herbs*; As *Graſſe*, *Plantine*, and the like; If the *Earth* be Harder and Courſer, it putteth forth *Herbs* more *Rough*, as *Thiſtles*, *Firres*, &c. 564

It is Common *Experience*, that where *Alleyes* are cloſe *Grauelled*, the *Earth* putteth forth, the firſt yeere, *Knot-graſſe*, and after *Spire-graſſe* The *Cauſe* is, for that the *Hard Grauell*, or *Pebble* at the firſt Laying, will not ſuffer the *Graſſe* to come forth vpright, but turneth it to finde his way where it can; But after that the *Earth* is ſomewhat looſened at the Top, the Ordinary *Graſſe* commeth vp. 565

It is reported, that *Earth*, being taken out of *Shady* and *Watry Woods*, ſome depth, and Potted, will put forth *Herbs* of a Fat and Iuycy Subſtance; As *Penny-wort*, *Purſlane*, *Houſleeke*, *Penny-royall*, &c. 566

The *Water* alſo doth ſend forth *Plants*, that haue no *Roots* fixed in the Bottome; But they are leſſe *Perfect Plants*, being almoſt but *Leaues*, and thoſe ſmall ones: Such is that wee call *Duck-Weed*; which hath a *Leafe* no bigger than a *Thyme-Leafe*, but of a freſher Greene, and putteth forth a little *String* into the *Water*, farre from the *Bottome*. As for the *Water-Lilly*, it hath a *Root* in the *Ground*: And ſo haue a Number of other *Herbs* that grow in *Ponds*. 567

It is reported by ſome of the *Ancients*, and ſome *Moderne Teſtimony* likewiſe, that there be ſome *Plants*, that grow vpon the Top of the *Sea*; 568

Being supposed to grow of some *Concretion* of *Slime* from the *Water*, where the *Sunne* beateth hot, and where the *Sea* stirreth little. As for *Alga Marina* (*Sea-weed*,) *and Eryngium* (*Sea Thistle*) both haue *Roots*; but the *Sea-weed* vnder the *Water*, the *Sea-Thistle* but vpon the *Shore*.

569 The Ancients haue noted, that there are some *Herbs*, that grow out of *Snow*, laid vp close together, and *Putrified*; And that they are all *Bitter*; And they name one specially, *Flomus*, which we call *Moth-Mullein*. It is certaine, that *Wormes* are found in *Snow* commonly, like *Earth-Wormes*; And therefore it is not vnlike, that it may likewise put forth *Plants*.

570 The *Ancients* haue affirmed, that there are some *Herbs*, that grow out of *Stone*; Which may be, for that it is certaine, that *Toads* haue bin found in the Middle of a Free-Stone. Wee see also, that *Flints*, lying aboue *Ground*, gather *Mosse*; And *Wall-flowers*, and some other *Flowers*, grow vpon *Walls*; But whether vpon the Maine *Bricke*, or *Stone*, or whether out of the *Lime* or *Chinkes*, is not well obserued; For *Elders* and *Ashes* haue beene seene to grow out of *Steeples*: But they manifestly grow out of *Clefts*; In so much as when they grow big, they will dis-ioyne the *Stone*. And besides it is doubtfull, whether the *Mortar* it selfe putteth it forth, or whether some *Seeds* be not let fall by *Birds*. There be likewise *Rocke-Herbs*; But I suppose those are, where there is some *Mould* or *Earth*, It hath likewise beene found, that great *Trees* growing vpon *Quarries*, haue put downe their *Root* into the *Stone*.

571 In some *Mines* in *Germany*, as is reported, there grow in the Bottome *Vegetables*; And the *Work-Folkes* vse to say, they haue *Magicall Vertue*; And will not suffer Men to gather them.

572 The *Sea-Sands* seldome beare *Plants*. Whereof the *Cause* is yeelded, by some of the *Ancients*, for that the *Sunne* exhaleth the *Moisture*, before it can incorporate with the *Earth*, and yeeld a Nourishment for the *Plant*. And it is affirmed also, that Sand hath (alwaies) his *Root* in *Clay*; And that there be no Veines of *Sand*, any great depth within the *Earth*.

573 It is certaine, that some *Plants* put forth for a time, of their owne *Store*, without any *Nourishment* from *Earth*, *Water*, *Stone*, &c. Of which *Vide* the *Experiment* 29.

Experiments in Consort touching *Forraine Plants*.

574 IT is reported, that *Earth*, that was brought out of the *Indies*, and other *Remote Countries*, for *Ballast* of *Ships*, cast vpon some *Grounds* in *Italy*, did put forth *Forraine Herbs*, to vs in *Europe* not knowne; And that which is more, that of their *Roots*, *Barkes*, and *Seeds*, confused together, and mingled with other *Earth*, and well Watred with *Warme Water*, there came forth *Herbs* much like the Other.

575 *Plants* brought out of *Hot Countries*, will endeuour to put forth, at the same *Time*, that they vsually do in their owne *Climate*; And therfore to preserue them, there is no more required, than to keepe them from the Iniury of Putting backe by *Cold*. It is reported also, that *Graine* out

of

of the *Hotter Countries* translated into the *Colder*, will be more forward, than the Ordinary *Graine* of the *Cold Countrie*. It is likely, that this will proue better in *Graines*, than in *Trees*; For that *Graines* are but *Annuall*; And so the *Vertue* of the *Seed* is not worne out; Whereas in a *Tree*, it is embased by the *Ground*, to which it is Remoued.

Many *Plants*, which grow in the *Hotter Countries*; being set in the *Colder*, will neuertheleſſe, euen in thoſe *Cold Countries*, being ſowne of *Seeds* late in the *Spring*, come vp and abide moſt Part of the *Summer*; As wee finde it in *Orenge* and *Limon-Seeds*, &c. The *Seeds* whereof, Sowne in the End of *Aprill*, will bring forth Excellent *Sallets*, mingled with other *Herbs*. And I doubt not but the *Seeds* of *Clowe-Trees*, and *Pepper-Seeds*, &c. if they could come hither *Greene* enough to be ſowne, would doe the like. 576

Experiments in Conſort, touching the *Seaſons* in which *Plants* come forth.

THere be ſome *Flowers*, *Bloſſomes*, *Graines*, and *Fruits*, which come more *Early*, And Others which come more *Late* in the *Yeere*. The *Flowers* that come early, with vs, are; *Prime-Roſes*, *Violets*, *Anemonies*, *Water-Daffadillies*, *Crocus Vernus*, and ſome early *Tulippa's*. (And they are all *Cold Plants*;) Which therefore (as it ſhould ſeeme) haue a quicker *Perception*, of the *Heat* of the *Sunne* Increaſing, than the *Hot Herbs* haue; As a *Cold Hand* will ſooner finde a little *Warmth*, than a *Hot*. And thoſe that come next after, are *Wall-Flowers*, *Cowſlips*, *Hyacinths*, *Roſemary-Flowers*, &c. And after them, *Pincks*, *Roſes*, *Flowerdeluces*, &c. And the lateſt are *Gilly-Flowers*, *Holly-oakes*, *Larks-Foot*, &c. The Earlieſt *Bloſſomes* are, the *Bloſſomes* of *Peaches*, *Almonds*, *Cornelians*, *Mezerions*, &c. And they are of ſuch *Trees*, as haue much *Moiſture*, either *Watrie* or *Oylie*. And therefore *Crocus Vernus* alſo, being an *Herbe*, that hath an *Oylie Iuyce*, putteth forth early. For thoſe alſo finde the *Sunne* ſooner than the *Drier Trees*. The *Graines* are, firſt *Rye* and *Wheat*; Then *Oats* and *Barley*; Then *Peaſe* and *Beanes*. For though Greene *Peaſe* and *Beanes* be eaten ſooner, yet the Drie Ones, that are vſed for *Horſe-meat*, are ripe laſt; And it ſeemeth that the Fatter *Graine* commeth firſt. The Earlieſt *Fruits* are, *Strawberries*, *Cherries*, *Gooſeberries*, *Corrans*; And after them, *Early Apples*, *Early Peares*, *Apricots*, *Raſps*; And after them *Damaſins*, and moſt Kinde of *Plums*, *Peaches*, &c. And the lateſt are *Apples*, *Wardens*, *Grapes*, *Nuts*, *Quinces*, *Almonds*, *Sloes*, *Brier-Berries*, *Heps*, *Medlars*, *Seruices*, *Cornelians*, &c. 577

It is to be noted, that (commonly) *Trees* that *ripen lateſt*, *bloſſome ſooneſt*: As *Peaches*, *Cornelians*, *Sloes*, *Almonds*, &c. And it ſeemeth to be a Worke of Prouidence, that they bloſſome ſo ſoone; For otherwiſe, they could not haue the *Sunne* long enough to ripen. 578

There be Fruits (but rarely,) that come *twice a yeare*; as ſome *Peares*, *Strawberries*, &c. And it ſeemeth they are ſuch, as abound with Nouriſhment; Whereby after one Period, before the *Sunne* waxeth too weake, they can endure another. The *Violet* alſo, amongſt *Flowers*, commeth twice a Yeare; Eſpecially the *Double White*; And that alſo 579

is a *Plant* full of Moiſture. *Roſes* come twice, but it is not without *Cuttino*, as hath beene formerly ſaid.

580 In *Muſconia*, though the *Corne* come not vp, till late *Spring*, yet their *Harueſt* is as Early as Ours. The *Cauſe* is, for that the *Strength* of the *Ground* is kept in with the *Snow*; And wee ſee with vs, that if it bee a long *winter*, it is commonly a more *Plentifull Yeare*: And after thoſe kinde of *winters* likewiſe, the *Flowers*, and *Corne*, which are Earlier, and Later, doe come commonly at once, and at the ſame time; Which troubleth the *Husbandman* many times; For you ſhall haue *Red Roſes*, and *Damaske Roſes*, come together; And likewiſe the *Harueſt* of *Wheat* and *Barley*. But this happeneth euer, for that the Earlier ſtayeth for the Later; And not that the Later commeth ſooner.

581 There be diuers *Fruit-Trees*, in the *Hot Countries*, which haue *Bloſſomes*, and *Young Fruit*, and *Ripe Fruit*, almoſt all the Yeare, ſucceeding one another. And it is ſaid, the *Orenge* hath the like with vs, for a great Part of Summer; And ſo alſo hath the *Figge*. And no doubt, the *Naturall Motion* of *Plants*, is to haue ſo; But that either they want *Iuyce* to ſpend; Or they meet with the *Cold* of the Winter: And therefore this *Circle* of *Ripening* cannot be, but in *Succulent Plants*, and *Hot Countries*.

582 Some *Herbs* are but *Annuall*, and die, *Root* and all, once a Yeare; As *Borrage*, *Lettuce*, *Cucumbers*, *Muſk-Melons*, *Baſil*, *Tobacco*, *Muſtard-Seed*, and all kindes of *Corne*; Some continue many Yeeres; As *Hyſſope*, *Germander*, *Lauander*, *Fennell*, &c. The *Cauſe* of the *Dying* is double; The firſt is the *Tenderneſſe* and *Weakneſſe* of the *Seed*, which maketh the Period in a ſmall time; As it is in *Borrage*, *Lettuce*, *Cucumbers*, *Corne*, &c. And therefore none of theſe are Hot. The other *Cauſe* is, for that ſome *Herbs* can worſe endure *Cold*; As *Baſill*, *Tobacco*, *Muſtard-Seed*; And theſe haue (all) much *Heat*.

Experiments in Conſort, touching the *Laſting* of *Herbs* and *Trees*.

583 THe *Laſting* of *Plants* is moſt in thoſe that are *Largeſt* of *Body*; As *Oaks*, *Elme*, *Cheſ-nut*, the *Loat-Tree*, &c. And this holdeth in *Trees*; But in *Herbs* it is often contrary; For *Borage*, *Colewort*, *Pompions*, which are *Herbs* of the *Largeſt Size*, are of ſmall Durance; Whereas *Hyſſope*, *Winter-Sauory*, *Germander*, *Thyme*, *Sage*, will laſt long. The *Cauſe* is, for that *Trees* laſt according to the *Strength*, and *Quantity* of their *Sap* and *Iuyce*: Being well munited by their *Barke* againſt the Iniuries of the *Aire*: But *Herbs* draw a Weake *Iuyce*; And haue a Soft *Stalke*; And therefore thoſe amongſt them which laſt longeſt, are *Herbs* of *Strong Smell*, and with a *Sticky Stalke*.

584 *Trees* that beare *Maſt*, and *Nuts*, are commonly more laſting, than thoſe that beare *Fruits*; Eſpecially the *Moiſter Fruits*: As *Oakes*, *Beeches*, *Cheſ-nuts*, *Wall-nuts*, *Almonds*, *Pine-Trees*, &c. laſt longer than *Apples*, *Peares*, *Plums*, &c. The *Cauſe* is, the *Fatneſſe*, and *Oylineſſe* of the *Sap*; Which euer waſteth leſſe, than the more *Watry*.

585 *Trees*, that bring forth their *Leaues* late in the *Yeere*, and caſt them likewiſe late, are more *laſting*, than thoſe that ſprout their Leaues Early, or ſhed

ſhed them betimes. The *Cauſe* is, for that the late *Comming forth* ſheweth a *Moiſture* more fixed; And the other more looſe, and more eaſily reſolued. And the ſame *Cauſe* is, that *Wilde Trees* laſt longer than *Garden-Trees*; And in the ſame kinde, thoſe whoſe *Fruit* is Acide, more than thoſe whoſe *Fruit* is ſweet.

Nothing procureth the *Laſting* of *Trees*, *Buſhes*, and *Herbs*, ſo much, as often *Cutting*: For euery *Cutting* cauſeth a Renouation of the *Iuyce* of the *Plant*; That it neither goeth ſo farre, nor riſeth ſo faintly, as when the *Plant* is not *Cut*: Inſomuch as *Annuall Plants*, if you cut them ſeaſonably, and will ſpare the vſe of them, and ſuffer them to come vp ſtill young, will laſt more Yeares than one; As hath beene partly touched; Such as is *Lettuce*, *Purſlane*, *Cucumber*, and the like. And for *Great Trees*, we ſee almoſt all *Ouer-growne Trees*, in Church-yards, or neare Ancient Buildings, and the like, are *Pollards*, or *Dottards*, and not *Trees* at their full Height. 586

Some *Experiment* would be made, how by *Art* to make *Plants* more *Laſting* than their ordinary Period; As to make a *Stalke* of *Wheat*, &c. laſt a whole yeare. You muſt euer preſuppoſe, that you handle it ſo, as the *Winter* killeth it not; For we ſpeake only of *Prolonging* the *Naturall Period*. I conceiue, that the *Rule* will hold; That whatſoeuer maketh the *Herbe* come later, than at his time, will make it laſt longer time: It were good trie it, in a *Stalke* of *Wheat*, &c. ſet in the Shade, and encompaſſed with a Caſe of *Wood*, not touching the *Straw*, to keepe out Open *Aire*. 587

As for the Preſeruation *of* Fruits, *and* Plants, *as well vpon the* Tree, *or* Stalke, *as gathered, we ſhall handle it vnder the* Title *of* Conſeruation *of* Bodies.

THe *Particular Figures* of *Plants*, we leaue to their *Deſcriptions*; But ſome few things, in generall, we will obſerue. *Trees* and *Herbs*, in the Growing forth of their *Boughes* and *Branches*, are not *Figured*, and keepe no Order. The *Cauſe* is, for that the *Sap*, being reſtrained in the *Rinde*, and *Barke*, breaketh not forth at all; (As in the Bodies of *Trees*, and *Stalkes* of *Herbs*,) till they begin to branch; And then, when they make an Eruption, they breake forth caſually, where they finde beſt way, in the *Barke* or *Rinde*. It is true, that ſome *Trees* are more ſcattered in their *Boughes*; As *Sallow-Trees*, *Warden-Trees*, *Quince-Trees*, *Medlar-Trees*, *Limon-Trees*, &c. Some are more in the forme of a *Pyramis*, and come almoſt to todd; As the *Peare-Tree*, (which the *Critickes* will haue to borrow his name of πῦρ, *Fire*,) *Orenge-Trees*, *Fir-Trees*, *Seruice-Trees*, *Lime-Trees*, &c. And ſome are more ſpred and broad; As *Beeches*, *Hornbeame*, &c. The reſt are more indifferent. The *Cauſe* of Scattering the *Boughes*, is the Haſty breaking forth of the *Sap*; And therefore thoſe *Trees* riſe not in a *Body* of any Height, but branch neere the *Ground*. The *Cauſe* of the *Pyramis*, is the Keeping in of the *Sap*, long before it branch; And the ſpending of it when it beginneth to branch, by equall degrees. The

Experiments in Conſort, touching the ſeuerall *Figures* of *Plants*. 588

Spreading is cauſed by the *Carrying* vp of the *Sap*, plentifully, without Expence; And then putting it forth ſpeedily, and at once.

589 There bee divers *Herbs*, but no *Trees*, that may be ſaid to haue ſome kinde of Order, in the Putting forth of their *Leaues*: For they haue *Ioynts* or *Knuckles*, as it were Stops in their *Germination*; As haue *Gilly-Flowers*, *Pinkes*, *Fennell*, *Corne*, *Reeds*, and *Canes*. The *Cauſe* whereof is, for that the *Sap* aſcendeth vnequally, and doth (as it were) tire and ſtop by the way. And it ſeemeth, they haue ſome *Cloſeneſſe* and *Hardneſſe* in their *Stalke*, which hindereth the *Sap* from going vp, vntill it hath gathered into a Knot, and ſo is more vrged to put forth. And therefore, they are moſt of them hollow, when the *Stalke* is drie. As *Fennell-Stalke*, *Stubble*, and *Canes*.

590 *Flowers* haue (all exquiſite *Figures*; And the *Flower-Numbers*, are (chiefly) *Fiue*, and *Foure*, As in *Prime-Roſes*, *Brier-Roſes*, *Single-Muſk-Roſes*, *Single-Pinkes*, *and Gilly-Flowers*, &c. which haue fiue *Leaues*: *Lillies*, *Flower-de-Luces*, *Borage*, *Bugloſſe*, &c. which haue foure Leaues. But ſome put forth *Leaues* not Numbred; But they are euer ſmall Ones; As *Mary-Golds*, *Trifoile*, &c. Wee ſee alſo, that the *Sockets*, and *Supporters* of *Flowers*, are *Figured*; As in the Fiue *Brethren* of the *Roſe*; *Sockets* of *Gilly-Flowers*, &c. *Leaues* alſo are all *Figured*; Some Round, Some Long; None Square; And many iagged on the Sides; Which *Leaues* of *Flowers* ſeldome are. For I account the *Iagging* of *Pinkes*, and *Gilly-Flowers*, to be like the Inequality of *Oake-Leaues*, or *Vine-Leaues*, or the like; But they ſeldome or neuer haue any ſmall *Purles*.

Experiments in Conſort touching ſome *Principall Differences* in *Plants*.

OF *Plants*, ſome few put forth their *Bloſſomes* before their *Leaues*; As *Almonds*, *Peaches*, *Cornelians*, *Black-Thorne*, &c. But moſt put forth ſome *Leaues* before their *Bloſſomes*; As *Apples*, *Peares*, *Plums*, *Cherries*, *White-Thorne*, &c. The *Cauſe* is, for that thoſe, that put forth their *Bloſſomes* firſt, haue either an Acute and *Sharpe Spirit*; (And therefore commonly they all put forth early in the Spring, and ripen very late; As moſt of the Particulars before mentioned;) Or elſe an *Oyly Iuyce*, which is apter to put out *Flowers*, than *Leaues*.

592 Of *Plants*, ſome are *Greene* all *Winter*; Others caſt their *Leaues*. There are *Greene* all *winter*, *Holly*, *Iuy*, *Box*, *Firre*, *Eugh*, *Cypreſſe*, *Iuniper*, *Bayes*, *Roſe-Mary*, &c. The *Cauſe* of the Holding *Greene*, is the Cloſe and Compact *Subſtance* of their *Leaues*, and the *Pedicles* of them. And the *Cauſe* of that againe, is either the *Tough*, and *Viſcous Iuyce* of the *Plant*; Or the *Strength* and *Heat* thereof. Of the firſt Sort is *Holly*; Which is of ſo *Viſcous* a *Iuyce*, as they make *Bird-lime* of the *Barke* of it. The *Stalke* of *Iuy* is Tough and not Fragile, as we ſee in other ſmall Twigs dry. *Firre* yeeldeth *Pitch*. *Box* is a faſt and heauy *Wood*, as we ſee it in *Bowles*. *Eugh* is a Strong and Tough *Wood*, as we ſee it in *Bowes*. Of the ſecond Sort is *Iuniper*, which is a *Wood* Odorate, and maketh a hot Fire. *Bayes* is likewiſe a Hot and Aromaticall *Wood*; And ſo is *Roſe-Mary* for a *Shrub*. As for the *Leaues*, their Denſity appeareth, in that, either they are Smooth

and

and Shining, as in *Bayes*, *Holly*, *Box*, &c. Or in that they are Hard and Spiry, as in the reſt. And Tryall would be made of *Grafting* of *Roſe-Mary*, and *Bayes*, and *Box*, vpon a *Holly-Stocke*; Becauſe they are *Plants* that come all *Winter*. It were good to trie it alſo with *Grafts* of other *Trees*, either *Fruit Trees*, or *Wilde Trees*; to ſee whether they will not yeeld their *Fruit*, or beare their *Leaues*, later; and longer in the *Winter*; becauſe the *Sap* of the *Holly* putteth forth moſt in the *Winter*. It may be alſo a *Mezerion-Tree*, grafted vpon a *Holly*, will proue both an Earlier, and a Greater *Tree*.

There be ſome *Plants*, that beare no *Flowers*; and yet beare *Fruit*: There be ſome, that beare *Flowers*, and no *Fruit*. There be ſome that beare neither *Flowers*, nor *Fruit*. Moſt of the great *Timber-Trees*, (as *Oakes*, *Beeches*, &c.) beare no apparent *Flowers*: Some few (likewiſe) of the *Fruit-Trees*; As *Mulberry*, *Wall-nut*, &c. And ſome *Shrubs*, (as *Iuniper*, *Holly*, &c.) beare no *Flowers*. Diuers *Herbs* alſo beare *Seeds*, (which is as the *Fruit*,) and yet beare no *Flowers*: As *Purſlane*, &c. Thoſe that beare *Flowers* and no *Fruit*, are few; As the *Double Cherry*, the *Sallow*, &c. But for the *Cherry*, it is doubtfull, whether it be not by Art, or Culture; For if it be by Art, then Triall would be made, whether *Apples*, and other *Fruits Bloſſomes*, may not be doubled. There are ſome Few, that beare neither *Fruit*, nor *Flower*; As the *Elme*, the *Poplars*, *Box*, *Brakes*, &c. 593

There be ſome *Plants*, that ſhoot ſtill vpwards, and can *Support* themſelues; As the greateſt Part of *Trees* and *Plants*: there bee ſome Other, that *Creepe* along the *Ground*: Or *Winde* about other *Trees*, or *Props*, and cannot ſupport themſelues; As *Vines*, *Iuy*, *Briar*, *Briony*, *Woodbines*, *Hops Climatis*, *Camomill*, &c. The *Cauſe* is, (as hath beene partly touched,) for that all *Plants* (naturally) moue vpwards; But if the *Sap* put vp too faſt, it maketh a ſlender *Stalke*, which will not ſupport the weight: And therefore theſe latter Sort are all Swift and Haſty Commers. 594

THe firſt and moſt Ordinary *Helpe* is *Stercoration*. The *Sheeps-Dung* is one of the beſt; And next, the *Dung* of *Kine*: And thirdly, that of *Horſes*: Which is held to be ſomewhat too hot, vnleſſe it be mingled. That of *Pigeons* for a Garden, or a ſmall Quantity of Ground, excelleth. The *Ordering* of *Dung* is; If the *Ground* be *Arable*, to ſpread it immediatly before the *Plowing* and *Sowing*; And ſo to *Plow* it in: For if you ſpread it long before, the *Sunne* will draw out much of the *Fatneſſe* of the *Dung*: If the *Ground* be *Grazing Ground*, to ſpread it ſomewhat late; towards *Winter*; that the *Sunne* may haue the leſſe Power to drie it vp. As for ſpeciall *Compoſts* for *Gardens*, (as a *Hot Bed*, &c.) wee haue handled them before. Experiments in Conſort touching all Manner of *Compoſts*, and *Helps* of Ground. 595

The Second *Kind* of *Compoſt*, is, the *Spreading* of diuers *Kinds* of *Earths* As *Marle*, *Chalke*, *Sea-Sand*, *Earth* vpon *Earth*, *Pond-Earth*; And the *Mixtures* of them. *Marle* is thought to be the beſt; As hauing moſt Fatneſſe; And 596

And not Heating the *Ground* too much. The next *Sea-Sand*; Which (no doubt) obtaineth a ſpeciall Vertue, by the *Salt*: For *Salt* is the firſt Rudiment of life. *Chalke* ouer-heateth the *Ground* a little. And therefore is beſt vpon *Gold Clay-Grounds*, or *Moiſt Grounds*: But I heard a great *Husband* ſay, that it was a common Errour to think that *Chalke* helpeth *Arable Grounds*, but helpeth not *Grazing Grounds*; Whereas (indeed) it helpeth *Graſſe*, as well as *Corne*: But that which breedeth the Errour is, becauſe after the *Chalking* of the *Ground*, they weare it out with many *Crops*, without Reſt; And then (indeed) afterward it will beare little *Graſſe*, becauſe the *Ground* is tired out. It were good to trie the laying of *Chalke* vpon *Arable Grounds*, a little while before *Plowing*; And to *Plow* it in, as they doe the *Dung*; But then it muſt be Friable firſt, by Raine, or Lying: As for *Earth*, it *Compaſſeth* it Selfe; For I knew a *Great Garden*, that had a *Field* (in a manner) powred vpon it; and it did beare *Fruit* excellently the firſt yeare of the Planting: For the *Surface* of the *Earth* is euer the Fruitfulleſt. And *Earth* ſo prepared hath a double *Surface*. But it is true, as I conceiue, that ſuch *Earth*, as hath *Salt Petre* bred in it, if you can procure it without too much charge, doth excell. The way to haſten the *Breeding* of *Salt-Petre*, is to forbid the Sunne, and the Growth of *Vegetables*. And therefore if you make a large Houell, thatched, ouer ſome Quantity of Ground; Nay if you doe but Plancke the Ground ouer, it will breed *Salt-Petre*. As for *Pond Earth*, or *Riuer Earth*, it is a very good *Compoſt*; Eſpecially if the *Pond* haue beene long vncleanſed, and ſo the *Water* bee not too Hungry: And I iudge it will be yet better, if there be ſome *Mixture* of *Chalke*.

597 The Third *Helpe* of *Ground*, is, by ſome other *Subſtances*, that haue a Vertue to make *Ground* Fertile, though they bee not meerely *Earth*: wherein *Aſhes* Excell; In ſo much as the Countries about *Ætna*, and *Veſuuius*, haue a kinde of Amends made them, for the Miſchiefe the Eruptions (many times) doe, by the exceeding *Fruitfulneſſe* of the *Soyle*, cauſed by the *Aſhes*, ſcattered about. *Soot* alſo, though thin ſpred, in a *Field*, or *Garden*, is tried to bee a very good *Compoſt*. For *Salt*, it is too Coſtly: But it is tried, that mingled with *Seed-Corne*, and ſowen together, it doth good: And I am of Opinion, that *Chalke* in Powder, mingled with *Seed-Corne*, would doe good; Perhaps as much as *Chalking* the *Ground* all ouer. As for the *Steeping* of the *Seeds*, in ſeuerall *Mixtures* with *Water*, to giue them Vigour; Or *Watring Grounds* with *Compoſt-Water*; We haue ſpoken of them before.

598 The Fourth *Helpe* of *Ground*, is, the *Suffering* of *Vegetables to die into the Ground*; And ſo to Fatten it; As the *Stubble* of *Corne*, Eſpecially *Peaſe*. *Brakes* caſt vpon the *Ground*, in the Beginning of *Winter*, will make it very Fruitfull. It were good (alſo) to try, whether *Leaues* of *Trees* ſwept together with ſome *Chalke* and *Dung* mixed, to giue them more Heart, would not make a good *Compoſt*: For there is nothing loſt, ſo much as *Leaues* of *Trees*; And as they lye ſcattered, and without Mixture, they rather make the *Ground* ſoure, than otherwiſe.

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The Fifth *Helpe* of *Ground*, is *Heat* and *warmth*. It hath beene anciently practiſed to burne *Heath*, and *Ling*, and *Sedge*, with the vantage of the *Wind*, vpon the *Ground*: We ſee, that *warmth* of *Walls* and *Enclosures*, mendeth *Ground*: We ſee alſo that *Lying open* to the *South*, mendeth *Ground*: We ſee againe, that the *Foldings* of *Sheepe* helpe *Ground*, as well by their *warmth*, as by their *Compoſt*: And it may be doubted, whether the *Couering* of the *Ground* with *Brakes*, in the Beginning of the *Winter*, (whereof we ſpake in the laſt *Experiment*,) helpeth it not, by reaſon of the *warmth*. Nay ſome very good *Husbands* doe ſuſpect, that the *Gathering* vp of *Flints*, in *Flinty Ground*, and laying them on *Heapes*, (which is much vſed,) is no good *Husbandry*; For that they would keepe the *Ground* Warme. 599

The Sixth *Helpe* of *Ground* is, by *Watering*, and *Irrigation*; which is in two Manners: The one by *Letting* in, and *Shutting* out *Waters*, at ſeaſonable Times: For *water* at ſome Seaſons, and with too long ſtay, doth good; But at ſome other Seaſons, and with reaſonable Stay, doth hurt. And this ſeruеth only for *Meadowes*, which are along ſome *Riuer*. The other way is, to bring *Water* from ſome *Hanging Grounds*, where there are *Springs*, into the *Lower Grounds*, carrying it in ſome long *Furrowes*; And from thoſe *Furrowes*, drawing it trauerſe to ſpread the *Water*. And this maketh an excellent Improuement, both for *Corne* and *Graſſe*. It is the richer, if thoſe *Hanging Grounds* be fruitfull, becauſe it waſheth off ſome of the Fatneſſe of the *Earth*: But howſoeuer it profiteth much. Generally, where there are great Ouerflowes, in *Fens*, or the like, the drowning of them in the *Winter*, maketh the *Summer* following more fruitfull: The *Cauſe* may be, for that it keepeth the *Ground* warme, and nouriſheth it: But the *Fen-Men* hold, that the *Sewers* muſt be kept ſo, as the *Water* may not ſtay too long in the *Spring*, till the *Weeds* and *Sedge* be growne vp; For then the *Ground* will be like a Wood, which keepeth out the Sunne; And ſo continueth the Wet; Whereby it will neuer graze (to purpoſe) that yeare. Thus much for *Irrigation*. But for *Auoidances*, and *Draynings* of water, where there is too much, and the *Helps* of *Ground* in that kinde, we ſhall ſpeake of them in another Place. 600

NATV-

NATVRALL HISTORIE.

VII. Century.

THe *Differences* betweene *Animate* and *Inanimate Bodies*, we shall handle fully vnder the *Title* of *Life*, and *Liuing Spirits*, and *Powers*. We shall therefore make but a briefe Mention of them in this Place. The Maine *Differences* are two. All *Bodies* haue *Spirits*, and *Pneumaticall Parts* within them: But the Maine *Differences* betweene *Animate* and *Inanimate*, are two: The first is, that the *Spirits* of *Things Animate*, are all *Continued* with themselues, and are *Branched* in *Veines*, and secret *Canales*, as *Bloud* is: And in *Liuing Creatures*, the *Spirits* haue not only *Branches*, but certaine *Cells* or *Seats*, where the *Principall Spirits* doe reside; and whereunto the rest doe resort: But the *Spirits* in things *Inanimate* are shut in, and cut off by the *Tangible Parts*; And are not perious one to another; As *Aire* is in *Snow*. The Second Maine *Difference* is, that the *Spirits* of *Animate Bodies*, are all in some degree, (more or lesse,) Kindled and inflamed; And haue a fine *Commixture* of *Flame*, and an *Aeriall Substance*. But *Inanimate Bodies* haue their *Spirits* no whit *Inflamed*, or *Kindled*. And this *Difference* consisteth not in the *Heat* or *Coolenesse* of *Spirits*; For *Cloues* and other *Spices*, *Naphtha* and *Petroleum*, haue exceeding *Hot Spirits*, (hotter a great deale than *Oyle*, *Wax*, or *Tallow*, &c.) but not *Inflamed*. And when any of those Weake and Temperate *Bodies* come to

Experiments in Consort touching the *Affinities*, and *Differences*, betweene *Plants* and *Inanimate Bodies*.

601

to be Inflamed, then they gather a much greater *Heat*, than others haue *Vn-inflamed*; besides their *Light*, and *Motion*, &c.

602 The *Differences*, which are *Secundary*, and proceed from these two *Radicall Differences*, are; First, *Plants* are all *Figurate* and *Determinate*, which *Inanimate Bodies* are not; For looke how farre the *Spirit* is able to Spread and Continue it selfe; So farre goeth the *Shape*, or *Figure*; And then is *determined*. Secondly, *Plants* doe nourish; *Inanimate Bodies* doe not: They haue an *Accretion*, but no *Alimentation*. Thirdly, *Plants* haue a *Period* of *Life*; which *Inanimate Bodies* haue not. Fourthly, they haue a *Succession*, and *Propagation* of their *Kinde*; which is not in *Bodies Inanimate*.

603 The *Differences* betweene *Plants*, and *Metalls* or *Fossiles*, besides those foure before mentioned, (For *Metalls* I hold Inanimate,) are these: First, *Metalls* are more *Durable* than *Plants*: Secondly, they are more *Solid* and *Hard*: Thirdly, they are wholly *Subterrany*; Whereas *Plants* are part aboue *Earth*, and part vnder *Earth*.

604 There be very few *Creatures*, that participate of the *Nature* of *Plants*, and *Metalls* both; *Corall* is one of the Neareſt of both *Kindes*: Another is *Vitriol*, for that is apteſt to ſprout with *Moiſture*.

605 Another ſpeciall *Affinity* is betweene *Plants* and *Mould* or *Putrefaction*: For all *Putrefaction* (if it diſſolue it not in *Arefaction*) will in the end iſſue into *Plants*, or *Liuing Creatures* bred of *Putrefaction*. I account *Moſſe*, and *Muſhromes*, and *Agaricke*, and other of thoſe kinds, to be but *Moulds* of the *Ground*, *Walls*, and *Trees*, and the like. As for *Fleſh*, and *Fiſh*, and *Plants* themſelues, and a number of other things, after a *Mouldineſſe*, or *Rottenneſſe*, or *Corrupting*, they will fall to breed *Wormes*. Theſe *Putrefactions*, which haue *Affinity* with *Plants*, haue this *Difference* from them; That they haue no *Succeſſion* or *Propagation*, though they *Nouriſh*, and haue a *Period* of *Life*, and haue likewiſe ſome *Figure*.

606 I left once, by chance, a *Citron* cut, in a cloſe Roome, for three Summer-Moneths, that I was abſent; And at my Returne, there were growne forth, out of the Pith cut, *Tufts* of *Haires*, an Inch long, with little blacke Heads, as if they would haue beene ſome *Herbe*.

Experiments in Conſort, touching the *Affinities*, and *Differences*, of *Plants*, and *Liuing Creatures*: And the *Confiners* and *Participles* of them.

THe *Affinities* and *Differences* betweene *Plants* and *Liuing Creatures*, are theſe that follow. They haue both of them *Spirits Continued*, and *Branched*, and alſo *Inflamed*: But firſt in *Liuing Creatures*, the *Spirits* haue a *Cell* or *Seat*, which *Plants* haue not; As was alſo formerly ſaid: And ſecondly, the *Spirits* of Liuing *Creatures* hold more of *Flame*, than the *Spirits* of *Plants* doe. And theſe two are the *Radicall Differences*. For the *Secondary Differences*, they are as follow. Firſt, *Plants* are all *Fixed* to the *Earth*; Whereas all *Liuing Creatures* are ſeuered, and of themſelues. Secondly, *Liuing Creatures* haue *Locall Motion*; *Plants* haue not. Thirdly, *Liuing Creatures* nouriſh from their *Vpper Parts*, by the *Mouth* chiefly; *Plants* nouriſh from below, namely from the *Roots*. Fourthly, *Plants* haue their *Seed* and *Seminall Parts* vppermoſt; *Liuing Creatures*

607 haue

haue them lower-moſt: And therefore it was ſaid, not elegantly alone, but Philoſophically; *Homo eſt Planta inuerſa*; *Man is like a Plant turned vpwards*: For the *Root* in *Plants*, is as the *Head* in *Liuing Creatures*. Fifthly, *Liuing Creatures* haue a more exact *Figure* than *Plants*. Sixthly, *Liuing Creatures* haue more *Diuerſity* of *Organs* within their *Bodies*, and (as it were) *Inward Figures*, than *Plants* haue. Seuenthly, *Liuing Creatures* haue *Senſe*, which *Plants* haue not. Eighthly, *Liuing Creatures* haue *Voluntary Motion*, which *Plants* haue not.

For the *Difference* of *Sexes* in *Plants*, they are oftentimes by name diſtinguiſhed; As *Male-Piony*, *Female-Piony*; *Male-Roſe-mary*, *Female-Roſe-mary*; *He-Holly*, *She-Holly*; &c. but *Generation* by *Copulation* (certainly) extendeth not to *Plants*. The neereſt approach of it, is betweene the *Hee-Palme*, and the *Shee-Palme*; which, (as they report,) if they grow neere, incline the One to the other: In ſo much as, (that which is more ſtrange) they doubt not to report, that to keepe the *Trees* vpright from Bending, they tie *Ropes* or *Lines*, from the one to the other, that the *Contact* might be enioyed by the *Contact* of a *Middle Body*. But this may be Faigned, or at leaſt Amplified. Neuertheleſſe, I am apt enough to thinke, that this ſame *Binarium* of a Stronger and a Weaker, like vnto *Maſculine* and *Feminine*, doth hold in all *Liuing Bodies*. It is confounded ſometimes; As in ſome *Creatures* of *Putrifaction*, wherein no *Markes* of *Diſtinction* appeare: And it is doubled ſometimes; As in *Hermaphrodites*: But generally there is a Degree of Strength in moſt *Species*. 608

The *Participles* or *Confiners* betweene *Plants* and *Liuing Creatures*, are ſuch chiefly, as are *Fixed*, and haue no *Locall Motion* of *Remoue*, though they haue a *Motion* in their *Parts*; Such as are *Oyſters*, *Cockles*, and ſuch like. There is a Fabulous Narration, that in the *Northerne Countries*, there ſhould be an *Herbe* that groweth in the likeneſſe of a *Lambe*, and feedeth vpon the *Graſſe*, in ſuch ſort, as it will bare the *Graſſe* round about. But I ſuppoſe that the *Figure* maketh the *Fable*; For ſo we ſee, there be *Bee Flowers*, &c. And as for the *Graſſe*, it ſeemeth the *Plant*, hauing a great *Stalke* and *Top*, doth prey vpon the *Graſſe*, a good way about, by drawing the *Iuyce* of the *Earth* from it. 609

Experiments touching *Plants*.

THe *Indian Fig* boweth his *Roots* downe ſo low, in one yeare, as of it ſelfe it taketh *Root* againe: And ſo multiplieth from *Root* to *Root*; Making of one *Tree* a kinde of *Wood*. The *Cauſe* is the *Plenty* of the *Sap*, and the *Softneſſe* of the *Stalke*, which maketh the *Bough*, being ouerloaden, and not ſtiffely vpheld, weigh downe. It hath *Leaues*, as broad as a little *Target*, but the *Fruit* no bigger than *Beanes*. The *Cauſe* is, for that the continuall Shade increaſeth the *Leaues*, and abateth the *Fruit*, which neuertheleſſe is of a pleaſant Taſte. And that (no doubt) is cauſed, by the *Suppleneſſe* and *Gentleneſſe* of the Iuyce of that *Plant*, being that which maketh the *Boughes* alſo ſo Flexible. 610

It is reported by one of the *Ancients*, that there is a certaine *Indian* 611

Tree, hauing few, but very great, *Leaues*, three Cubits long, and two broad; And that the *Fruit*, being of good Taſte, groweth out of the *Barke*. It may be, there be *Plants*, that powre out the *Sap* ſo faſt, as they haue no leaſure, either to diuide into many *Leaues*, or to put forth *Stalks* to the *Fruit*. With vs, *Trees* (generally) haue ſmall *Leaues*, in compariſon. The *Fig* hath the greateſt; And next is the *Vine*, *Mulberry*, and *Sycamore*; And the Leaſt, are thoſe of the *Willow*, *Birch*, and *Thorne*. But there be found *Herbs* with farre greater *Leaues* than any *Tree*; As the *Burre*, *Gourd*, *Cucumber*, and *Cole-wort*. The *Cauſe* is, (like to that of the *Indian Fig*,) the haſty and plentifull Putting forth of the *Sap*.

612 There be three things in vſe for *Sweetneſſe*; *Sugar*, *Honey*, *Manna*. For *Sugar*, to the *Ancients* it was ſcarce knowne, and little vſed. It is found in *Canes*: *Quære*, whether to the firſt *Knuckle*, or further vp? And whether the very *Bark* of the *Cane* it ſelfe do yeeld *Sugar* or no? For *Honey*, the *Bee* maketh it, or gathereth it; But I haue heard from one, that was induſtrious in Husbandry, that the labour of the *Bee* is about the *Wax*; And that he hath knowne in the beginning of *May*, *Honey-Combs* empty of *Honey*; And within a forthnight, when the Sweet *Dewes* fall, filled like a *Cellar*. It is reported alſo by ſome of the *Ancients*, that there is a *Tree* called *Occhus*, in the Valleyes of *Hyrcania*, that diſtilleth *Honey* in the *Mornings*. It is not vnlike, that the *Sap* and *Teares* of ſome *Trees*, may be ſweet. It may be alſo, that ſome ſweet Iuyces, fit for many vſes, may be concocted out of *Fruits*, to the Thickneſſe of *Honey*; or perhaps of *Sugar*; The likelieſt are *Raiſins* of the Sunne, *Figs*, and *Corrans*: The Meanes may be enquired.

613 The *Ancients* report of a *Tree*, by the *Perſian Sea*, vpon the *Shore-Sands*, which is nouriſhed with the *Salt-Water*; And when the *Tide* ebbeth, you ſhall ſee the *Roots*, as it were bare without *Barke*, (being as it ſeemeth corroded by the *Salt*,) and graſping the *Sands* like a *Crab*; Which neuertheleſſe beareth a *Fruit*. It were good to try ſome *Hard Trees*, as a *Seruice-Tree*, or *Fir-Tree*, by ſetting them within the *Sands*.

614 There be of *Plants*, which they vſe for *Garments*, theſe that follow. *Hempe*, *Flax*; *Cotton*; *Nettles*, (whereof they make *Nettle-Cloth*;) *Sericum*, which is a *Growing Silke*; They make alſo *Cables* of the *Barke* of *Lime-Trees*. It is the *Stalke* that maketh the *Filaceous* Matter commonly; And ſometimes the *Downe* that groweth aboue.

615 They haue in ſome *Countries* a *Plant* of a *Roſie Colour*, which ſhutteth in the *Night*, Openeth in the *Morning*, and Openeth wide at *Noone*; which the *Inhabitants* of thoſe *Countries* ſay is a *Plant* that *Sleepeth*. There be *Sleepers* enow then; For almoſt all *Flowers* doe the like.

616 Some *Plants* there are, but rare, that haue a *Moſſy* or *Downy Root*; And likewiſe that haue a number of *Threds*, like *Beards*; As *Mandrakes*; whereof *Witches* and *Impoſtours* make an vgly *Image*, giuing it the Forme of a *Face* at the *Top* of the *Root*, and leaue thoſe *Strings* to make a broad *Beard* downe to the Foot. Alſo there is a Kinde of *Nard* in *Creet*, (being a Kinde of *Phu*) that hath a *Root* hairy, like a *Rough-Footed-Dones* foot.

foot. So as you may see, there are of *Roots*, *Bulbous Roots*, *Fibrous Roots*, and *Hirsute Roots*. And I take it in the *Bulbous*, the Sap hasteneth most to the Aire, and Sunne: In the *Fibrous*, the Sap delighteth more in the Earth, and therefore putteth downward: And the *Hirsute* is a Middle betweene both; That besides the Putting forth vpwards, and downwards, putteth forth in Round.

There are some *Teares* of *Trees*, which are kembed from the *Beards* of *Goats*: For when the *Goats* bite and crop them, especially in the Mornings, the Dew being on, the *Teare* commeth forth, and hangeth vpon their *Beards*: Of this Sort is some kinde of *Ladanum*. 617

The *Irrigation* of the *Plaine-Tree* by *Wine*, is reported by the *Ancients*, to make it Fruitfull. It would be tried likewise with *Roots*; For vpon *Seeds* it worketh no great Effects. 618

The way to carry *Forraine Roots*, a long Way, is to vessell them close in *Earthen Vessels*. But if the *Vessels* bee not very Great, you must make some Holes in the Bottome, to giue some refreshment to the *Roots*; Which otherwise (as it seemeth) will decay, and suffocate. 619

The ancient *Cinnamon*, was, of all other *Plants*, while it grew, the Dryest; And those Things, which are knowne to comfort other *Plants*, did make that more Sterill: For in *Showers* it prospered worst: It grew also amongst *Bushes* of other kindes, where commonly *Plants* doe not thriue: Neither did it loue the Sunne: There might be one *Cause* of all those Effects; Namely, the sparing Nourishment, which that *Plant* required. *Quære* how farre *Cassia*, which is now the Substitute of *Cinnamon*, doth participate of these Things. 620

It is reported by one of the *Ancients*, that *Cassia*, when it is gathered, is put into the *Skins* of *Beasts*, newly fleyed; And that the *Skins* Corrupting, and Breeding *Wormes*, the *Wormes* doe deuoure the *Pith* and *Marrow* of it, and so make it Hollow; But meddle not with the *Barke*, because to them it is bitter. 621

There were, in Ancient Time, *Vines*, of farre greater *Bodies*, than we know any; For there haue beene *Cups* made of them, and an *Image* of *Iupiter*. But it is like they were *Wilde Vines*; For the *Vines*, that they vse for *Wine*, are so often Cut, and so much Digged and Dressed; that their *Sap* spendeth into the *Grapes*, and so the *Stalke* cannot increase much in *Bulke*. The *Wood* of *Vines* is very durable; without *Rotting*. And that which is strange, though no *Tree* hath the *Twigs*, while they are greene, so brittle, yet the *Wood* dried is extreme Tough; And was vsed by the *Captaines* of *Armies*, amongst the *Romans*, for their *Cudgels*. 622

It is reported, that in some Places, *Vines* are suffered to grow like *Herbs*, spreading vpon the *Ground*; And that the *Grapes* of those *Vines* are very great. It were good to make triall, whether *Plants* that vse to be borne vp by Props, will not put forth greater *Leaues*, and greater *Fruits*, if they be laid along the *Ground*; As *Hops*, *Iuy*, *Wood-bine*, &c. 623

Quinces, or *Apples*, &c. if you will keepe them long, drowne them in *Honey*; But because *Honey* (perhaps) will giue them a Taste Ouer- 624

luſhious, it were good to make Triall in *Powder* of *Sugar*; Or in *Syrrup* of *Wine*, onely Boyled to Height. Both theſe would likewiſe be tried in *Orenges*, *Limons*, and *Pomgranats*; For the *Powder* of *Sugar*, and *Syrrup* of *Wine*, will ſerue for more times than once.

625 The *Conſeruation* of *Fruit* would be alſo tried in *Veſſels*, filled with *fine Sand*, or with *Powder* of *Chalke*; Or in *Meale* and *Flower*; Or in *Duſt* of *Oake-wood*; Or in *Mill*.

626 Such *Fruits*, as you appoint for *Long Keeping*, you muſt gather before they be full *Ripe*; And in a *Faire* and *Dry Day*, towards *Noone*; And when the *Wind* bloweth not *South*; And when the *Moone* is vnder the *Earth*; And in *Decreaſe*.

627 Take *Grapes*, and hang them in an *Empty Veſſell*, well Stopped; And ſet the *Veſſell*, not in a *Cellar*, but in ſome dry *Place*; And it is ſaid, they will laſt long. But it is reported by ſome, they will keepe better, in a *Veſſell* halfe full of *Wine*, ſo that the *Grapes* touch not the *wine*.

628 It is reported, that the *Preſerning* of the *Salke*, helpeth to preſerue the *Grape*; Eſpecially if the *Stalke* be put into the *Pith* of *Elder*, the *Elder* not touching the *Fruit*.

629 It is reported by ſome of the *Ancients*, that *Fruit* put in *Bottles*, and the *Bottles* let downe into *Wells* vnder *Water*, will keepe long.

630 Of *Herbs* and *Plants*, ſome are good to eat Raw; As *Lettuce*, *Endiue*, *Purſlane*, *Tarragon*, *Creſſes*, *Cucumbers*, *Musk-Melons*, *Raddiſh*, &c. Others onely after they are *Boyled*, or haue *Paſſed the Fire*; As *Parſley*, *Clary*, *Sage*, *Parſnips*, *Turnips*, *Aſparagus*, *Artichoakes*, (though they alſo being young are eaten *Raw*:) But a Number of *Herbs*, are not *Eſculent* at all; As *Worme-Wood*, *Graſſe*, *Greene-Corne*, *Centory*, *Hyſſope*, *Lauender*, *Balme*, &c. The *Cauſes* are, for that the *Herbs*, that are not *Eſculent*, doe want the two *Taſtes*, in which *Nouriſhment* reſteth; Which are, *Eat*, and *Sweet*; And haue (contrariwiſe) *Bitter* and *Ouer-ſtrong Taſtes*, or a *Iuyce* ſo Crude, as cannot be ripened to the degree of *Nouriſhment*. *Herbs* and *Plants*, that are *Eſculent Raw*, haue *Fatneſſe*, or *Sweetneſſe*, (as all Eſculent *Fruits*;) Such are *Onions*, *Lettuce*, &c. But then it muſt bee ſuch a *Fatneſſe*, (for as for *Sweet Things*, they are in effect alwaies *Eſculent*) as is not Ouer-groſſe, and Loading of the *Stomach*, For *Pparſnips* and *Leeks* haue *Fatneſſe*; But it is too Groſſe and Heauy without *Boyling*. It muſt be alſo in a Subſtance ſomewhat Tender; For we ſee *Wheat*, *Barley*, *Artichoakes*, are no good *Nouriſhment*, till they haue Paſſed the *Fire*; But the *Fire* doth ripen, and maketh them ſoft and tender, and ſo they become *Eſculent*. As for *Radiſh* and *Tarragon*, and the like, they are for *Condimentts*, and not for *Nouriſhment*. And euen ſome of thoſe *Herbs*, which are not *Eſculent*, are notwithſtanding *Poculent*; As *Hops*, *Broome*, &c. *Quære* what *Herbs* are good for *Drinke*, beſides the two aforenamed; For that it may (perhaps) eaſe the Charge of *Brewing*, if they make *Beere* to require leſſe *Malt*, or make it laſt longer.

631 *Parts* fit for the *Nouriſhment* of *Man*, in *Plants*, are *Seeds*, *Roots*, and *Fruits*; But chiefly *Seeds*, and *Roots*. For *Leaues*, they giue no *Nouriſh-*

ment,

ment, at all, or very little: No more doe *Flowers*, or *Blossomes*, or *Stalkes*. The Reason is, for that *Roots*, and *Seeds*, and *Fruits*, (in as much as all *Plants* consist of an *Oily* and *watry Substance* commixed,) haue more of the *Oily Substance*; And *Leaues*, *Flowers*, &c. of the *watry*. And secondly, they are more *Concocted*; For the *Root*, which continueth euer in the *Earth*, is still *Concocted* by the *Earth*; And *Fruits*, and *Graines*, (wee see) are halfe a yeere, or more, in *Concocting*; Whereas *Leaues* are out, and Perfect in a Monerh.

Plants (for the most part) are more strong, both in *Taste*, and *Smell*, 632
in the *Seed*, than in the *Leafe*, and *Root*. The *Cause* is, for that in *Plants*, that are not of a Fierce and Eager *Spirit*, the Vertue is increased by *Concoction*, and *Maturation*, which is euer most in the *Seed*; But in *Plants*, that are of a Fierce and Eager Spirit, they are stronger whilest the *Spirit* is enclosed in the *Root*; And the *Spirits* doe but weaken and dissipate, when they come to the *Aire*, and *Sunne*; As we see it in *Onions*, *Garlick*, *Dragon*, &c. Nay there be *Plants*, that haue their *Roots*, very *Hot*, and *Aromaticall*; And their *Seeds*, rather *Insipide*; As *Ginger*. The *Cause* is (as was touched before,) for that the *Heat* of those *Plants* is very Dissipable; which vnder the *Earth* is contained and held in, But when it commeth to the *Aire*, it exhaleth.

The *Iuyces* of *Fruits* are either *Watry*, or *Oily*. I reckon amongst 633
the *watry*, all the *Fruits* out of which *Drinke* is expressed; As the *Grape*, the *Apple*, the *Peare*, the *Cherry*, the *Pomgranate*, &c. And there are some others, which, though they be not in vse for *Drinke*, yet they appeare to be of the same *Nature*; As *Plummes*, *Seruices*, *Mulberries*, *Rasps*, *Orenges*, *Limons*, &c. And for those *Iuyces*, that are so fleshy, as they cannot make *Drinke* by Expression, yet (perhaps) they may make *Drinke* by Mixture of *Water*;

Poculaq; admistis imitantur vitea Sorbis.

And it may bee *Heps* and *Brier Berries* would doe the like. Those that haue *Oily Iuyce*, are; *Oliues*, *Almonds*, *Nuts* of all sorts, *Pine Apples*, &c. And their *Iuyces* are all *Inflammable*. And you must obserue also, that some of the *watry Iuyces*, after they haue gathered *Spirit*, will Burne and Enflame; As *Wine*. There is a Third Kind of *Fruit*, that is sweet, without either *Sharpnesse* or *Oylinesse*: Such as is the *Fig*, and the *Date*.

It hath beene noted, that most *Trees*, and specially those that beare 634
Mast, are fruitfull but once in two yeeres. The *Cause* (no doubt) is, the *Expence* of *Sap*; For many *Orchard-Trees*, well Cultured, will beare diuers yeers together.

There is no *Tree*, which besides the *Naturall Fruit*, doth beare so many 635
Bastard-Fruits, as the *Oake* doth: For besides the *Acorne*, it beareth *Galls*, *Oake-Apples*, and certaine *Oake-Nuts*, which are Inflammable; And certaine *Oake-Berries*, sticking close to the *Body* of the *Tree*, without *Stalke*. It beareth also *Misseltoe*, though rarely. The *Cause* of all these may be, the *Closeneſſe* and *Solidnesse* of the *Wood*, and *Pith* of the *Oake*; Which maketh seuerall *Iuyces* finde seuerall *Eruptions*. And therefore,

if you will deuiſe to make any *Super-Plants*, you muſt euer giue the *Sap* Plentifull Riſing, and hard Iſſue.

636 There are two *Excreſcences* which grow vpon *Trees*; Both of them in the Nature of *Muſhromes*: The one the *Romans* called *Boletus*; Which groweth vpon the *Roots* of *Oakes*; and was one of the *Dainties* of their *Table*; The other is *Medicinall*, that is called *Agaricke*, (whereof we haue ſpoken before) which groweth vpon the Tops of *Oakes*; Though it be affirmed by ſome, that it groweth alſo at the *Roots*. I doe conceiue, that many *Excreſcences* of *Trees* grow chiefly, where the *Tree* is dead, or faded; For that the *Naturall Sap* of the *Tree*, corrupteth into ſome *Preternaturall Subſtance*.

637 The greater part of *Trees* beare *Moſt*, and *Beſt*, on the *Lower Boughes*; As *Oakes*, *Figs*, *Wall-Nuts*, *Peares*, &c. But ſome beare *Beſt* on the *Top-Boughes*; As *Crabs*, &c. Thoſe that beare beſt below, are ſuch, as Shade doth more good to, than Hurt. For generally all *Fruits* beare beſt loweſt; Becauſe the *Sap* tireth not, hauing but a ſhort Way: And therefore in *Fruits* ſpred vpon *walls*, the Loweſt are the Greateſt, as was formerly ſaid; So it is the *Shade* that hindereth the *Lower Boughes*; Except it be in ſuch *Trees*, as delight in *Shade*; Or at leaſt beare it well. And therefore, they are either Strong *Trees*, as the *Oake*; Or elſe they haue large *Leaues*, as the *Wallnut* and *Fig*; Or elſe they grow in *Pyramis*, as the *Peare*. But if they require very much *Sunne*, they beare beſt on the *Top*; As it is in *Crabs*, *Apples*, *Plums*, &c.

638 There be *Trees* that beare beſt when they begin to bee *Old*; As *Almonds*, *Peares*, *Vines*, and all *Trees* that giue *Maſt*. The *Cauſe* is, for that all *Trees* that beare *Maſt* haue an *Oyly Fruit*; And *Young Trees* haue a more *Watry Iuyce*, and leſſe Concocted; And of the ſame kinde alſo is the *Almond*. The *Peare* likewiſe, though it be not *Oyly*, yet it requireth much *Sap*, and well Concocted; For we ſee it is a Heauy *Fruit*, and Solid; Much more than *Apples*, *Plummes*, &c. As for the *Vine*, it is noted, that it beareth more *Grapes* when it is *Young*; But *Grapes* that make better *Wine*, when it is *Old*; For that the *Iuyce* is better Concocted: And wee ſee that *Wine* is Inflammable; So as it hath a kinde of *Oylineſſe*. But the moſt Part of *Trees*, amongſt which are *Apples*, *Plummes*, &c. beare beſt when they are *Young*.

639 There be *Plants*, that haue a *Milke* in them, when they are Cut; As *Figs*, *Old Lettuce*, *Sow-Thiſtles*, *Spurge*, &c. The *Cauſe* may be an *Inception* of *Putrefaction*; For thoſe *Milkes* haue all an *Acrimony*; though one would thinke they ſhould be *Lenitiue*. For if you write vpon Paper, with the *Milke* of the *Fig*, the Letters will not be ſeene, vntill you hold the Paper before the Fire, and then they wax Browne; Which ſheweth that it is a Sharpe or Fretting *Iuyce*: *Lettuce* is thought Poyſonous, when it is ſo *Old*, as to haue *Milke*; *Spurge* is a kinde of Poyſon in it Selfe; And as for *Sow-Thiſtles*, though Coneyes eat them, yet Sheepe and Cattell will not touch them; And beſides the *Milke* of them, rubbed vpon Warts, in ſhort time, weareth them away: Which ſheweth the *Milke* of

of them to be *Corosiue*. We see also, that *Wheat*, and other *Corne sowen*, if you take them forth of the *Ground*, before they sprout, are full of *Milke*; And the Beginning of *Germination* is euer a Kinde of *Putrefaction* of the *Seed*. *Euphorbium* also hath a *Milke*, though not very white, which is of a great *Acrimony*. And *Saladine* hath a yellow *Milke*, which hath likewise much *Acrimony*; For it cleanseth the *Eyes*. It is good also for *Cataracts*.

Mushromes are reported to grow, as well vpon the *Bodies* of *Trees*, as vpon their *Roots*, or vpon the *Earth*: And especially vpon the *Oake*. The *Cause* is, for that Strong *Trees*, are towards such *Excrescences*, in the Nature of *Earth*; And therefore Put forth *Mosse*, *Mushromes*, and the like. 640

There is hardly found a *Plant*, that yeeldeth a *Red Iuyce*, in the *Blade*, or *Eare*; Except it be the *Tree* that beareth *Sanguis Draconis*: Which groweth (chiefly) in the *Island Soquotra*: The *Herbe Amaranthus* (indeed,) is *Red* all ouer; And *Brasill* is *Red* in the *Wood*: And so is *Red Sanders*. That *Tree* of the *Sanguis Draconis*, groweth in the forme of a *Sugar-loafe*. It is like, that the *Sap* of that *Plant*, concocteth in the *Body* of the *Tree*. For wee see that *Grapes* and *Pomegranats*, are *Red* in the *Iuyce*, but are *Greene* in the *Teare*: And this maketh the *Tree* of *Sanguis Draconis*, lesser towards the *Top*, Because the *Iuyce* hasteneth not vp; And besides it is very *Astringent*; And therefore of Slow Motion. 641

It is reported, that *Sweet Mosse*, besides that vpon the *Apple-Trees*, groweth likewise (sometimes) vpon *Poplars*; And yet (generally) the *Poplar* is a Smooth *Tree* of *Barke*, and hath little *Mosse*. The *Mosse* of the *Larix Tree* burneth also Sweet, and sparkleth in the Burning. *Quære* of the *Mosses* of *Odorate Trees*, As *Cedar*, *Cypres*, *Lignum Aloës*, &c. 642

The *Death* that is most without Paine, hath beene noted to be, vpon the *Taking* of the *Potion* of *Hemlock*; which inhumanity was the Forme of *Execution* of *Capitall Offenders* in *Athens*. The *Poyson* of the *Aspe*, that *Cleopatra* vsed, hath some affinity with it. The *Cause* is, for that the *Torments* of *Death* are chiefly raised by the Strife of the *Spirits*; And these *Vapours* quench the *Spirits* by *Degrees*, Like to the *Death* of an extreme Old Man. I conceiue it is a lesse Painfull than *Opium*, because *Opium* hath Parts of *Heat* mixed. 643

There be *Fruits*, that are *Sweet* before they be *Ripe*; As *Mirabolanes*; So *Fennell-Seeds* are Sweet before they ripen, and after grow Spicie. And some neuer *Ripen* to be *Sweet*; As *Tamarinds*, *Berberries*, *Crabs*, *Sloes*, &c. The *Cause* is, for that the former Kinde haue much and subtill *Heat*, which causeth Early Sweetnesse; The latter haue a *Cold* and *Acide Iuyce*, which no *Heat* of the *Sunne* can sweeten. But as for the *Mirabolane*, it hath Parts of Contrary *Natures*; For it is *Sweet*, and yet *Astringent*. 644

There be few *Herbs* that haue a *Salt Taste*; And contrariwise all *Bloud* of *Liuing Creatures* hath a *Saltnesse*. The *Cause* may be, for that *Salt*, though it be the *Rudiment* of *Life*, yet in *Plants* the Originall *Taste* remaineth 645

remaineth not; For you ſhall haue them *Bitter*, *Sowre*, *Sweet*, *Biting*, but ſeldome *Salt*: But in *Liuing Creatures*, all thoſe High *Taſtes* may happen to be (ſometimes) in the *Humours*, but are ſeldome in the *Fleſh*, or *Subſtance*; Becauſe it is of a more *Oily Nature*; which is not very Suſceptible of thoſe *Taſtes*; And the *Saltneſſe* it ſelfe of *Bloud*, is but a light, and ſecret *Saltneſſe*: And euen among *Plants*, ſome doe participate of *Saltneſſe*, as *Alga Marina*, *Sampire*, *Scuruy-Graſſe*, &c. And they report, there is, in ſome of the *Indian-Seas*, a *Swimming Plant*, which they call *Salgazus*, ſpreading ouer the *Sea*; in ſuch ſort, as one would thinke it were a *Meadow*. It is certaine, that out of the *Aſhes* of all *Plants*, they extract a *Salt*, which they vſe in *Medicines*.

646 It is reported by one of the *Ancients*, that there is an *Herb* growing in the *Water*, called *Lincoſtis*, which is full of *Prickles*: This *Herbe* putteth forth another ſmall *Herbe* out of the *Leafe*; which is imputed to ſome *Moiſture*, that is gathered betweene the *Prickles*, which Putrified by the *Sunne*, Germinateth. But I remember alſo I haue ſeene, for a great Rarity, one *Roſe* grow out of another, like *Honey-Suckles*, that they call *Top* and *Top gallants*.

647 *Barley*, (as appeareth in the *Malting*,) being ſteeped in *Water* three dayes, and afterwards the *Water* drained from it, and the *Barley* turned vpon a drie floare, will ſprout, halfe an Inch long at leaſt: And if it bee let alone, and not turned, much more; vntill the Heart be out. *Wheat* will doe the ſame. Try it alſo with *Peaſe*, and *Beanes*. This *Experiment* is not like that of the *Orpin*, and *Semper-Viue*; For there it is of the old Store, for no *Water* is added; But here it is nouriſhed from the *Water*. The *Experiment* would be further driuen; For it appeareth already, by that which hath been ſaid, that *Earth* is not neceſſary to the firſt Sprouting of *Plants*; And we ſee that *Roſe-Buds* ſet in *Water*, will Blow: Therefore try whether the *Sprouts* of ſuch *Graines* may not be raiſed to a further Degree: As to an *Herbe*, or *Flower*, with *Water* only; Or ſome ſmall Commixture, of *Earth*: For if they will, it ſhould ſeeme by the *Experiments* before, both of the *Malt*, and of the *Roſes*, that they will come far faſter on in *Water*, than in *Earth*: For the *Nouriſhment* is eaſilier drawne out of *Water*, than out of *Earth*. It may giue ſome light alſo, that *Drinke* infuſed with *Fleſh*, as that with the *Capon*, &c. wil nouriſh faſter and eaſilier, than *Meat* and *Drinke* together. Try the ſame *Experiment* with *Roots*, as well as with *Graines*: as for Example, take a *Turnip*, and ſteepe it a while, and then dry it, and ſee whether it will ſprout.

684 *Malt* in the *Drenching* will ſwell; And that in ſuch a manner, as after the Putting forth in ſprouts, and the drying vpon the Keele, there will be gained at leaſt a Buſhell in eight, and yet the Sprouts are rubbed off; And there will be a Buſhell of *Duſt* beſides the *Malt*: Which I ſuppoſe to be, not only by the looſe, and open Laying of the *Parts*, but by ſome Addition of *Subſtance*, drawne from the *Water*, in which it was ſteeped.

649 *Malt* gathereth a *Sweetneſſe* to the *Taſte*, which appeareth yet more in

in the *Wort*. The *Dulcoration* of *Things* is worthy to be tryed to the full; For that *Dulcoration* importeth a degree to *Nouriſhment:* And the Making of *Things Inalimentall*, to become *Alimentall*, may be an *Experiment* of great Profit, for Making new *Victuall*.

Moſt *Seeds* in the Growing, leaue their *Huske* or *Rinde* about the *Root*; But the *Onion* will carry it vp, that it will be like a Cap vpon the Top of the *Young Onion*. The *Cauſe* may be, for that the *Skin* or *Huske* is not eaſie to breake; As we ſee by the Pilling of *Onions*, what a Holding *Subſtance* the *Skin* is. 650

Plants, that haue *Curled Leaues*, doe all abound with *Moiſture*; Which commeth ſo faſt on, as they cannot ſpread themſelues Plaine, but muſt needs gather together: The Weakeſt Kind of *Curling* is *Roughneſſe*; As in *Clary*, and *Burre*. The Second is *Curling* on the Sides; As in *Lettuce*, and *Young Cabbage*: And the Third is *Folding* into an *Head*; As in *Cabbage* full growne and *Cabbage-Lettuce*. 651

It is reported, that *Firre*, and *Pine*, eſpecially if they be *Old* and *Putrified*, though they ſhine not, as ſome *Rotten Woods* doe, yet in the ſudden *Breaking* they will ſparkle like Hard *Sugar*. 652

The *Roots* of *Trees* doe (ſome of them,) put downewards deepe into the *Ground*; As the *Oake*, *Pine*, *Firre*, &c. Some ſpread more towards the *Surface* of the *Earth*, As the *Aſh*, *Cypreſſe-Tree*, *Oliue*, &c. The *Cauſe* of this latter may be, for that ſuch *Trees* as loue the *Sunne*, doe not willingly deſcend farre into the *Earth*; And therefore thy are (commonly) *Trees*, that ſhoot vp much; For in their *Body*, their deſire of Approach to the *Sunne*, maketh them ſpread the leſſe. And the ſame Reaſon vnder *Ground*, to auoid Receſſe from the *Sunne*, maketh them ſpread the more. And we ſee it commeth to paſſe in ſome *Trees*, which haue beene planted too deep in the *Ground*, that for loue of Approach to the *Sunne*, they forſake their firſt *Root*, and put out another more towards the *Top* of the *Earth*. And wee ſee alſo, that the *Oliue* is full of *Oily Iuyce*; And *Aſh* maketh the beſt Fire; And *Cypreſſe* is an *Hot Tree*. As for the *Oake*, which is of the former ſort, it loueth the *Earth*; And therefore groweth ſlowly. And for the *Pine*, and *Firre* likewiſe, they haue ſo much *Heat* in themſelues, as they need leſſe the *Heat* of the *Sunne*. There be *Herbs* alſo, that haue the ſame difference; As the *Herbe* they call *Morſus Diaboli*; which putteth the *Root* downe ſo low, as you cannot pull it vp without *Breaking* which gaue Occaſion to the *Name*, and *Fable*; For that it was ſaid, it was ſo wholeſome a *Root*, that the *Deuill*, when it was gathered, bit it for *Enuy*: And ſome of the *Ancients* doe report, that there was a Goodly *Firre*, (which they deſired to remoue whole,) that had a *Root* vnder *Ground* eight Cubits deep; And ſo the *Root* came vp broken. 653

It hath beene obſerued, that a *Branch* of a *Tree*, being *Vnbarked* ſome ſpace at the Bottome, and ſo ſet into the *Ground*, hath growen, Euen of ſuch *Trees*, as if the *Branch* were ſet with the *Barke* on, they would not grow; yet contrariwiſe we ſee, that a *Tree* Pared round in the *Body*, aboue 654

Ground,

Ground, will die. The *Cauſe* may be, for that the *Vnbarkt Part* draweth the Nouriſhment beſt, but the *Barke* continueth it only.

655 *Grapes* will continue *Freſh*, and *Moiſt*, all Winter long, if you hang them, *Cluſter* by *Cluſter*, in the *Roofe* of a *Warme Roome*; Eſpecially, if when you gather the *Cluſter*, you take off with the *Cluſter* ſome of the *Stocke*.

656 The *Reed* or *Cane* is a *watry Plant*, and groweth not but in the *Water*; It hath theſe Properties; that it is *Hollow*; That it is *Knuckled* both *Stalke*, and *Root*; That being *Drie*, it is more *Hard* and *Fragile*, than other *Wood*; That it putteth forth no *Boughes*, though many *Stalkes* come out of one *Root*. It differeth much in Greatneſſe; The ſmalleſt being fit for Thatching of Houſes; And Stopping the Chinkes of Ships; Better than Glew, or Pitch. The Second Bigneſſe, is vſed for Angle-Rods, and Staues; And in *China* for beating of Offenders vpon the Thighes. The differing *Kindes* of them are; The *Common Reed*; The *Caſſia Fiſtula*; And the *Sugar-Reed*. Of all *Plants*, it boweth the eaſieſt, and riſeth againe. It ſeemeth, that amongſt *Plants*, which are nouriſhed with *Mixture* of *Earth* and *Water*, it draweth moſt Nouriſhment from *Water*; which maketh it the *Smootheſt* of all others in *Barke*; And the *Holloweſt* in *Body*.

657 The *Sap* of *Trees*, when they are let *Bloud*, is of differing *Natures*. Some more *watry* and *Cleare*; As that of *Vines*; of *Beeches*; of *Peares*. Some *Thicke*; As *Apples*. Some *Gummy*; As *Cherries*. Some *Froathy*, As *Elmes*. Some *Milkie*; As *Figs*. In *Mulberries*, the *Sap* ſeemeth to be (almoſt) towards the *Barke* only; For if you cut the *Tree*, a little into the *Barke*, with a *Stone*, it will come forth; If you pierce it deeper with a *Toole*, it will be drie. The *Trees*, which haue the *Moiſteſt Iuyces* in their *Fruit*, haue commonly the *Moiſteſt Sap* in their *Body*; For the *Vines* and *Peares* are very *Moiſt*; *Apples* ſomewhat more *Spongie*: The *Milke* of the *Figge* hath the quality of the *Rennet*, to gather *Cheeſe*: And ſo haue certaine *Sowre Herbs* wherewith they make *Cheeſe* in *Lent*.

658 The *Timber* and *Wood* are, in ſome *Trees*, more *Cleane*, in ſome more *Knottie*: And it is a good Triall, to trie it by Speaking at one End, and Laying the Eare at the Other: For if it be *Knotty*, the Voice will not paſſe well. Some haue the *Veines* more varied, and chamlotted; As *Oake*, whereof *Wainſcot* is made; *Maple*, whereof *Trenchers* are made: Some more ſmooth, as *Firre*, and *Walnut*: Some doe more eaſily breed *Wormes* and *Spiders*; Some more hardly, as it is ſaid of *Iriſh Trees*: Beſides, there be a Number of Differences that concerne their vſe; As *Oake*, *Cedar*, and *Cheſnut*, are the beſt Builders: Some are beſt for *Plough-Timber*; As *Aſh*: Some for *Peeres*, that are ſometimes wet, and ſometimes drie; As *Elme*: Some for *Planchers*; As *Deale*: Some for *Tables*, *Cupboards*, and *Deskes*; As *Walnuts*: Some for *Ship-Timber*; As *Oaks* that grow in *Moiſt Grounds*; For that maketh the *Timber* Tough, and not apt to rift with *Ordnance*; Wherein *Engliſh* and *Iriſh Timber* are thought to excell: Some for *Maſts* of *Ships*; As *Firre*, and *Pine*, becauſe of their Length

Length, Straightneſſe, and lightneſſe: Some for *Pale*, As *Oake*: Some for *Fuell*; As *Aſh*: And ſo of the reſt.

The *Comming* of *Trees* and *Plants* in certaine *Regions*, and not in others, is ſometimes *Caſuall*: For many haue beene tranſlated, and haue proſpered well; As *Damaske-Roſes*, that haue not beene knowne in *England* aboue an hundred yeares, and now are ſo common. But the liking of *Plants* in certaine *Soiles*, more than in others, is meerely *Naturall*; As the *Firre* and *Pine* loue the *Mountaines*; The *Poplar*, *Willow*, *Sallow*, and *Alder*, loue *Riuers*, and *Moiſt Places*: The *Aſh* loueth *Coppices*; But is beſt in *Standards* alone: *Iuniper* loueth *Chalke*; And ſo doe moſt *Fruit-Trees*: *Sampire* groweth but vpon *Rockes*: *Reeds* and *Oſiers* grow where they are waſhed with *Water*: The *Vine* loueth Sides of *Hills*, turning vpon the *South-Eaſt Sunne*, &c. 659

The *Putting forth* of certaine *Herbs* diſcouereth of what Nature the *Ground* where they put forth, is: As *Wilde Thyme* ſheweth good *Feeding Ground* for *Cattell*: *Betony* and *Strawberries* ſhew *Grounds* fit for Wood: *Camomill* ſheweth Mellow *Grounds* fit for *Wheat*. *Muſtard Seed*, growing after the *Plough*, ſheweth a good *Strong Ground* alſo for *Wheat*: *Burnet* ſheweth good *Meadow*: And the like. 660

There are found, in diuers *Countries*, ſome other *Plants*, that grow out of *Trees* and *Plants*, beſides *Miſſeltoe*: As in *Syria*, there is an *Herbe* called *Caſſytas*, that groweth out of tall *Trees*, and windeth it ſelfe about the ſame *Tree* where it groweth; And ſometimes about *Thornes*. There is a kinde of *Polypode*, that groweth out of *Trees*, though it windeth not. So likewiſe an *Herbe* called *Faunos*, vpon the *Wilde Oline*. And an *Herbe* called *Hippophaſton* vpon the *Fullers Thorne*; Which, they ſay, is good for the *Falling-Sickneſſe*. 661

It hath beene obſerued, by ſome of the *Ancients*, that howſoeuer *Cold* and *Eaſterly Winds*, are thought to bee great Enemies to *Fruit*; yet neuertheleſſe *South-Winds* are alſo found to doe Hurt; Eſpecially in the *Bloſſoming* time; And the more, if *Showers* follow. It ſeemeth they call forth the *Moiſture* too faſt. The *weſt-Winds* are the beſt. It hath beene obſerued alſo that *Greene* and *Open Winters* doe hurt *Trees*; In ſo much as if two or three ſuch *Winters* come together, *Almond-Trees*, and ſome other *Trees*, will dye. The *Cauſe* is the ſame with the former, becauſe the *Luſt* of the *Earth* ouerſpendeth it ſelfe; Howſoeuer ſome other of the *Ancients* haue commended *Warme Winters*. 662

Snowes, lying long, cauſe a *Fruitfull Yeare*: For firſt, they keepe in the *Strength* of the *Earth*; Secondly, they water the *Earth*, better than *Raine*; For in *Snow*, the *Earth* doth (as it were) ſucke the *Water*, as out of the *Teate*. Thirdly, the *Moiſture* of *Snow* is the fineſt *Moiſture*; For it is the *Froth* of the *Cloudy Waters*. 663

Showers, if they come a little before the *Ripening* of *Fruits*, doe good to all *Succulent* and *Moiſt Fruits*; As *Vines*, *Oliues*, *Pomegranates*; Yet it is rather for Plentie, than for Goodneſſe; For the beſt *Wines* are in the Drieſt *Vintages*: *Small Showers* are likewiſe good for *Corne*, ſo as 664

Parching

Parching Heats come not vpon them. Generally, *Night-Showers* are better than *Day-Showers*; For that the *Sunne* followeth not so fast vpon them: And wee see, euen in *Watring* by the *Hand*, it is best, in *Summer time*, to water in the *Euening*.

665 The *Differences* of *Earths*, and the *Triall* of them, are worthy to be diligently inquired. The *Earth*, that with *Showers* doth easiliest *Soften*, is commended; And yet some *Earth* of that kinde will bee very Dry, and Hard before the *Showers*. The *Earth* that casteth vp from the *Plough*, a Great *Clod*, is not so good, as that which casteth vp a Smaller *Clod*. The *Earth*, that putteth forth *Mosse* easily, and may be called *Mouldy*, is not good. The *Earth*, that smelleth well vpon the Digging, or Plowing, is commended; As containing the *Iuyce* of *Vegetables* almost already prepared. It is thought by some, that the *Ends* of low *Raine-Bowes*, fall more vpon one kinde of *Earth* than vpon another: As it may well bee; For that that *Earth* is most Roscide: And therefore it is commended for a Signe of good *Earth*. The *Poorenesse* of the *Herbs*, (it is plaine,) shew the *Poorenesse* of the *Earth*; And especially if they be in *Colour* more darke: But if the *Herbs* shew *withered*, or *Blasted* at the Top, it sheweth the *Earth* to be very *Cold*: And so doth the *Mossinesse* of *Trees*. The *Earth*, whereof the *Grasse* is soone *Parched* with the *Sunne*, and *Toasted*, is commonly *Forced Earth*, and Barren in his owne Nature. The *Tender*, *Chessome*, and *Mellow Earth*, is the best; Being meere *Mould*, betweene the two Extremes of *Clay*, and *Sand*; Especially if it be not *Loamy*, and *Binding*. The *Earth*, that after *Raine*, will scarce be *Plowed*, is commonly *Fruitfull*; For it is *Cleansing*, and full of *Iuyce*.

666 It is strange, which is obserued by some of the *Ancients*, that *Dust* helpeth the *Fruitfulnesse* of *Trees*; And of *Vines*, by name; In so much as they cast Dust vpon them of purpose. It should seeme, that that Powdring, when a Shower commeth, maketh a kinde of Soyling to the *Tree*, being *Earth* and *water*, finely laid on. And they note, that Countries, where the *Fields* and *Wayes* are *Dusty*, beare the best *Vines*.

667 It is commended by the *Ancients*, for an Excellent *Helpe* to *Trees*, to lay the *Stalkes* and *Leaues* of *Lupines* about the *Roots*; Or to Plow them into the *Ground*, where you will sow *Corne*. The *Burning* also of the *Cuttings* of *Vines*, and *Casting* them vpon *land*, doth much Good. And it was generally receiued of old, that the *Dunging* of *Grounds*, when the *West-Wind* bloweth, and in the *Decreasse* of the *Moone*, doth greatly helpe; The *Earth* (as it seemeth) being then more thirstie, and open, to receiue the *Dung*.

668 The *Grafting* of *Vines* vpon *Vines*, (as I take it,) is not now in vse: The *Ancients* had it, and that three wayes: The first was *Insition*, which is the Ordinary Manner of *Grafting*: The Second was *Terebration*, thorow the *Middle* of the *Stocke*, and Putting in the *Cions* there: And the Third was Paring of two *Vines*, that grow together, to the *Marrow* and Binding them close.

669 The *Diseases* and ill *Accidents* of *Corne*, are worthy to bee enquired; And

And would be more worthy to be enquired, if it were in Mens Power to helpe them; Whereas many of them are not to be remedied. The *Mildew* is one of the Greateſt; which (out of queſtion) commeth by *Cloſeneſſe* of *Aire*; And therefore in *Hills*, or large *Champaigne Grounds*, it ſeldome commeth; Such as is with vs *York's woald*. This cannot be remedied, otherwiſe than that in *Countries* of Small Encloſure, the *Grounds* bee turned into larger *Fields*: Which I haue knowen to doe good in ſome Farmes. Another *Diſeaſe* is the *Putting forth* of *Wilde Oats*, whereinto *Corne* oftentimes, (eſpecially *Barley*) doth degenerate. It happeneth chiefly from the *weakneſſe* of the *Graine* that is ſowen; For if it bee either too Old, or Mouldy, it will bring forth *wilde Oats*. Another *Diſeaſe* is the *Saciety* of the *Ground*; For if you ſow one *Ground* ſtill with the ſame *Corne*, (I meane not the ſame *Corne* that grew vpon the ſame *Ground*,) but the ſame *Kinde* of *Graine*; (As *Wheat*, *Barley*, &c.) it will proſper but poorely: Therefore beſides the *Reſting* of the *Ground*, you muſt varie the *Seed*. Another ill *Accident* is, from the *Winds*, which hurt at two times; At the *Flowring*, by *Shaking* off the *Flowers*; And at the full *Ripening*, by *Shaking* out the *Corne*. Another ill *Accident* is, *Drouth*, at the *Spindling* of the *Corne*; Which with vs is rare; But in Hotter *Countries*, common: Inſomuch as the Word, *Calamitas*, was firſt derived from *Calamus*, when the *Corne* could not get out of the *Stalke*. Another ill *Accident* is, *Ouer-wet* at *Sowing-time*; which with vs breedeth much *Dearth*; Inſomuch as the *Corne* neuer commeth vp; And (many times) they are forced to reſow *Sommer-Corne*, where they ſowed *Winter-Corne*. Another ill *Accident* is *Bitter Froſts*, continued, without *Snow*, Eſpecially in the Beginning of the *winter*, after the *Seed* is new Sowen. Another *Diſeaſe* is *wormes*; which ſometimes breed in the *Root*, and happen vpon Hot *Sunnes*, and *Showers*, immediately after the *Sowing*; And another *Worme* breedeth in the *Eare* it Selfe; Eſpecially when *Hot Sunnes* breake often out of *Clouds*. Another *Diſeaſe* is *weeds*; And they are ſuch, as either Choake, and Ouer-ſhadow the *Corne*, and beare it downe; Or ſtarue the *Corne*, and deceiue it of Nouriſhment. Another *Diſeaſe* is, *Ouer-Ranckneſſe* of the *Corne*; Which they vſe to remedy, by *Mowing* it after it is come vp; Or putting *Sheepe* into it. Another ill *Accident* is *Laying* of *Corne* with great *Raines*, neare, or in *Harueſt*. Another ill *Accident* is, if the *Seed* happen to haue touched *Oyle*, or any *Thing*, that is *Fat*; For thoſe *Subſtances* haue an *Antipathy* with *Nouriſhment* of *Water*.

The *Remedies* of the *Diſeaſes* of *Corne* haue beene obſerued as followeth. The *Steeping* of the *Graine*, before *Sowing*, a little time in *Wine*, is thought a *Preſeruatiue*: The *Mingling* of *Seed-Corne* with *Aſhes*, is thought to be good: The *Sowing* at the *Wane* of the *Moone*, is thought to make the *Corne* ſound: It hath not beene practiſed, but it is thought to bee of vſe, to make ſome *Miſcellane* in *Corne*; As if you ſow a few *Beanes* with *wheat*, your *wheat* will be the better. It hath beene obſerved, that the *Sowing* of *Corne* with *Houſleeke*, doth good. Though *Graine*, that

toucheth *Oile*, or *Fat*, receiueth hurt, yet the *Steeping* of it, in the *Dregs* of *Oile*, when it beginneth to Putrifie, (which they call *Amurca*,) is thought to aſſure it againſt *Wormes*. It is reported alſo, that if *Corne* bee *Mowed*, it will make the *Graine* Longer, but Emptier, and hauing More of the *Huske*.

671 It hath beene noted, that *Seed* of a yeere old, is the Beſt; And of two or three yeeres is Worſe; And that which is more Old, is quite Barren; Though (no doubt) ſome *Seeds* and *Graines* laſt better than others. The *Corne*, which in the *Vanning* lieth loweſt, is the beſt; And the *Corne*, which broken or bitten retaineth a little *Yellowneſſe*, is better than that which is very *White*.

672 It hath beene obſerued, that of all *Roots* of *Herbs*, the *Root* of *Sorrell* goeth the furtheſt into the *Earth*; Inſomuch as it hath beene knowen to goe three Cubits deepe; And that it is the *Root* that continueth fit (longeſt) to be ſet againe, of any *Root* that groweth. It is a *Cold* and *Acide Herbe*, that (as it ſeemeth) loueth the *Earth*, and is not much drawen by the *Sunne*.

673 It hath beene obſerued, that ſome *Herbs* like beſt, being watred with *Salt-water*; As *Radiſh*, *Beet*, *Rew*, *Pennyroyall*; This Triall would be extended to ſome other *Herbs*; Eſpecially ſuch as are Strong; As *Tarragon*, *Muſtard-Seed*, *Rocket*, and the like.

674 It is ſtrange that is generally receiued, how ſome *Poyſonous Beaſts* affect *Odorate* and *Wholeſome Herbs*; As that the *Snake* loueth *Fennell*; That the *Toad* will be much under *Sage*; That *Frogs* will be in *Cinquefoile*. It may be, it is rather the *Shade*, or other Couerture, that they take liking in, than the Vertue of the *Herbe*.

675 It were a Matter of great Profit, (ſaue that I doubt it is too Coniecturall to venture vpon,) if one could diſcerne, what *Corne*, *Herbs*, or *Fruits*, are like to be in *Plentie*, or *Scarcitie*, by ſome *Signes* and *Prognoſticks*, in the Beginning of the Yeere: For as for thoſe, that are like to be in *Plentie*, they may be bargained for, vpon the *Ground*; As the Old Relation was of *Thales*; who to ſhew how eaſie it was for a *Philoſopher* to be rich, when hee fore-ſaw a great *Plentie* of *Oliues*, made a *Monopoly* of them. And for *Scarcitie*, Men may make Profit in keeping better the old Store. Long *Continuance* of *Snow* is beleeued to make a *Fruitfull Yeere* of *Corne*: An *Early Winter*, or a verie *Late Winter*, a *Barren Yeere* of *Corne*: An Open and Serene *Winter*, an ill Yeere of *Fruit*: Theſe we haue partly touched before: But other *Prognoſticks* of like Nature are diligently to be enquired.

676 There ſeeme to be, in ſome *Plants*, *Singularities*, wherein they differ from all Other; The *Oliue* hath the *Oily Part*, only on the *Outſide*; Whereas all other *Fruits* haue it in the *Nut*, or *Kernell*. The *Firre* hath (in effect) no *Stone*, *Nut*, nor *Kernell*; Except you will count the little *Graines* *Kernels*. The *Pomegranate* and *Pine-Apple* haue onely, amongſt *Fruits*, *Graines* diſtinct in ſeuerall *Cells*. No *Herbs* haue *Curled Leaues*, but *Cabbage*, and *Cabbage-Lettuce*. None haue double *Leaues*, one belonging to the

the *Stalke*, another to the *Fruit* or *Seed*, but the *Artichoake*: No *Flower* hath that kinde of Spread that the *Woodbine* hath. This may bee a large Field of Contemplation; For it sheweth that in the Frame of *Nature*, there is, in the Producing of some *Species*, a Composition of Matter, which happeneth oft, and may be much diuersified: In others, such as happeneth rarely, and admitteth little Variety: For so it is likewise in *Beasts*: *Dogs* haue a Resemblance with *Wolues*, and *Foxes*; *Horses* with *Asses*; *Kine* with *Buffles*; *Hares* with *Conies*; &c. And so in *Birds*: *Kites* and *Kestrells* haue a Resemblance with *Hawkes*; *Common-Doues* with *Ring-Doues*, and *Turtles*; *Black-Birds* with *Thrushes* and *Mauisses*; *Crowes* with *Rauens*, *Dawes*, and *Choughs*, &c. But *Elephants*, and *Swine* amongst *Beasts*; And the *Bird* of *Paradise*, and the *Peacocke* amongst *Birds*; And some few others; haue scarce any other *Species*, that haue Affinity with them.

Wee leaue the *Description* of *Plants*, and their *Vertues*, to *Herballs*, and other like *Bookes* of *Naturall History*: Wherein *Mens diligence* hath beene great, euen to *Curiosity*: For our *Experiments* are only such, as doe euer ascend a Degree, to the *Deriuing* of *Causes*, and *Extracting* of *Axiomes*, which, wee are not ignorant, but that some, both of the *Ancient* and *Moderne Writers*, haue also laboured, But their *Causes*, and *Axiomes*, are so full of Imagination, and so infected with the old Receiued *Theories*, as they are meere *Inquinations* of *Experience*, and Concoct it not.

Experiment Solitary touching *Healing* of *Wounds*. 677

IT hath beene obserued, by some of the *Ancients*, that *Skins*, (especially of *Rams*,) newly pulled off, and applied to the *wounds* of *Stripes*, doe keepe them from Swelling, and Exulcerating; And likewise Heale them, and Close them vp; And that the *whites* of *Egs* doe the same. The *Cause*, is a Temperate *Conglutination*; For both bodies are Clammy, and Viscous, and doe bridle the *Deflux* of *Humours* to the Hurts, without Penning them in too much.

Experiment Solitary touching *Fat diffused* in *Flesh*. 678

YOu may turne (almost) all *Flesh* into a *Fatty Substance*, if you take *Flesh*, and cut it into Peeces, and put the Peeces into a *Glasse* couered with Parchment; And so let the *Glasse* stand six or seuen Houres in *Boyling Water*. It may be an *Experiment* of Profit, for Making of *Fat*, or *Grease* for many vses; But then it must be of such *Flesh* as is not Edible; As *Horses*, *Dogs*, *Beares*, *Foxes*, *Badgers*, &c.

Experiment Solitary touching *Ripening* of *Drink* before the *Time*. 679

IT is reported by one of the *Ancients*, that *New wine* put into *Vessels* well stopped, and the *Vessels* let downe into the *Sea*, will accelerate very much, the Making of them Ripe and Potable. The same would be tried in *Wort*.

Experiment Solitary touching *Piloſity* and *Plumage*. 680

Beaſts are more *Hairy* than *Men*; and *Sauage Men* more than *Ciuill*; And the *Plumage* of *Birds* exceedeth the *Piloſity* of *Beaſts*. The *Cauſe* of the Smoothneſſe in *Men*, is not any Abundance of *Heat* and *Moiſture*, though that indeed cauſeth *Piloſity*; But there is requiſite to *Piloſity*, not ſo much *Heat* and *Moiſture*, as *Excrementitious Heat* and *Moiſture*: (For whatſoeuer aſſimilateth, goeth not into the *Haire*:) And *Excrementitious Moiſture* aboundeth moſt in *Beaſts*, and *Men* that are more *Sauage*. Much the ſame Reaſon is there of the *Plumage* of *Birds*; For *Birds* aſſimilate leſſe, and excerne more than *Beaſts*: For their *Excrements* are euer liquid, and their *Fleſh* (generally) more dry: Beſides, they haue not *Inſtruments* for *Vrine*; And ſo all the *Excrementitious Moiſture* goeth into the *Feathers*: And therefore it is no Maruell, though *Birds* bee commonly better Meat than *Beaſts*, becauſe their *Fleſh* doth aſſimilate more finely, and ſecerneth more ſubtilly. Againe, the *Head* of *Man* hath *Haire* vpon the *firſt Birth*, which no other *Part* of the *Body* hath. The *Cauſe* may be *Want* of *Perſpiration*: For much of the Matter of *Haire*, in the other *Parts* of the *Body*, goeth forth by Inſenſible *Perſpiration*; And beſides, the *Skull* being of a more ſolid Subſtance, nouriſheth and aſſimilateth leſſe, and excerneth more: And ſo likewiſe doth the *Chinne*; We ſee alſo that *Haire* commeth not vpon the *Palmes* of the *Hands*, nor *Soales* of the *Feet*; Which are *Parts* more *Perſpirable*. And *Children* likewiſe are not *Hairy*, for that their *Skins* are more *Perſpirable*.

Experiments Solitary touching the *Quickneſſe* of *Motion* in *Birds*. 681

Birds are of *Swifter Motion* than *Beaſts*: For the *Flight* of many *Birds* is *Swifter*, than the race of any *Beaſts*. The *Cauſe* is, for that the *Spirits* in *Birds*, are in greater Proportion, in compariſon of the Bulke of their Body, than in *Beaſts*: For as for the Reaſon that ſome giue, that they are partly Carried, whereas *Beaſts* goe, that is Nothing; For by that Reaſon Swimming ſhould be ſwifter, than Running: And that Kinde of *Carriage* alſo, is not without Labour of the *Wing*.

Experiment Solitary touching the different *Cleereneſſe* of the *Sea*. 682

The *Sea* is *Clearer*, when the *North-wind* bloweth, than when the *South-wind*. The *Cauſe* is, for that *Salt-water* hath a little *Oylineſſe* in the *Surface* thereof; As appeareth in very Hot daies: And againe, for that the *Southerne Wind* relaxeth the *Water* ſomewhat; As no *Water Boyling* is ſo Cleere as *Cold Water*.

Experiment Solitary touching the different *Heats* of *Fire* and *Boyling Water*. 683

Fire burneth *Wood*, making it firſt *Luminous*; Then *Blacke* and *Brittle*; And laſtly, *Broken* and *Incinerate*: *Scalding Water* doth none of theſe. The *Cauſe* is, for that by *Fire*, the *Spirit* of the *Body* is firſt *Refined*, and then *Emitted*; Whereof the *Refining*, or Attenuation cauſeth the *Light*; And the *Emiſſion*, firſt the *Fragility*, and after the *Diſſolution* into *Aſhes*: Neither doth any other *Body* enter: But in *Water* the *Spirit* of the *Body* is not *Refined* ſo much; And beſides Part of the *Water* entreth; Which doth increaſe the *Spirit*, and in a degree extinguiſh it: Therefore we ſee

that

that *Hot Water* will quench *Fire*. And againe wee see, that in *Bodies*, wherein the *Water* doth not much enter, but only the *Heat* passeth, *Hot water* worketh the Effects of *Fire*: As in *Egges Boyled*, and *Roasted*, (into which the water entreth not at all) there is scarce difference to be discerned; But in *Fruit*, and *Flesh*, whereinto the *Water* entreth, in some Part, there is much more difference.

THe *Bottome* of a *Vessell* of *Boyling Water*, (as hath beene obserued) is not very much *Heated*; So as men may put their hand vnder the *Vessell*, and remoue it. The *Cause* is, for that the *Moisture* of *Water*, as it quencheth Coales, where it entreth; So it doth allay Heat, where it toucheth: And therefore note well, that *Moisture* although it doth not passe thorow *Bodies*, without *Communication* of some *Substance*, (As *Heat* and *Cold* doe,) yet it worketh manifest Effects; not by Entrance of the Body, but by Qualifying of the Heat, and Cold; As wee see in this *Instance*: And we see likewise, that the *Water* of *Things distilled* in *Water*, (which they call the *Bath*) differeth not much from the *Water* of *Things Distilled* by *Fire*: We see also, that *Pewter-Dishes*, with *Water* in them, will not Melt easily; But without it, they will: Nay we see more, that *Butter*, or *Oyle*, which in themselues are Inflammable, yet by Vertue of their *Moisture*, will doe the like.

Experiment Solitary touching the *Qualification* of *Heat* by *Moisture*. 684

IT hath beene noted by the *Ancients*, that it is dangerous to Picke ones *Eare*, whilest he *Yawneth*. The *Cause* is, for that in *Yawning*, the Inner *Parchment* of the *Eare* is extended, by the *Drawing* in of the *Spirit*, and *Breath*; For in *Yawning*, and *Sighing* both, the *Spirit* is first strongly Drawne in, and then strongly Expelled.

Experiment Solitary touching *Yawning*. 685

IT hath beene obserued by the *Ancients*, that *Sneezing* doth cease the *Hiccough*. The *Cause* is, for that the *Motion* of the *Hiccough*, is a *Lifting vp* of the *Stomacke*; which *Sneezing* doth somewhat depresse, and diuert the *Motion* another way. For first we see that the *Hiccough* commeth of *Fulnesse of Meat*, (especially in *Children*) which causeth an Extension of the *Stomacke*: We see also, it is caused by *Acide Meats*, or *Drinkes*, which is by the *Pricking* of the *Stomacke*: And this *Motion* is ceased, either by *Diuersion*; Or by *Detention* of the *Spirits*: *Diuersion*, as in *Sneezing*; *Detention*, as we see *Holding* of the *Breath*, doth helpe somewhat to cease the *Hiccough*: And putting a Man into an earnest Study doth the like; As is commonly vsed: And *Vinegar* put to the *Nosthrills*, or *Gargarized*, doth it also; For that it is *Astringent*, and inhabiteth the *Motion* of the *Spirits*.

Experiment Solitary touching *Hiccough*. 686

Looking against the *Sunne*, doth induce *Sneezing*. The *Cause* is, not the *Heating* of the *Nosthrils*; For then the *Holding* vp of the *Nosthrils* against the *Sunne*, though one Winke, would doe it; But the *Drawing* downe of the *Moisture* of the *Braine*: For it will make the *Eyes* run with

Experiment Solitary touching *Sneezing*. 687

Water; And the *Drawing* of *Moiſture* to the *Eyes*, doth draw it to the *Noſthrils*, by *Motion* of *Conſent*; And ſo followeth *Sneezing*; As contrariwiſe the *Tickling* of the *Noſthrils* within, doth draw the *Moiſture* to the *Noſthrils*, and to the *Eyes* by *Conſent*; For they alſo will *Water*. But yet it hath beene obſerued, that if one be about to *Sneeze*, the Rubbing of the *Eyes*, till they run with Water, will preuent it. Whereof the *Cauſe* is, for that the *Humour*, which was deſcending to the *Noſthrils*, is diuerted to the *Eyes*.

Experiment Solitary touching the *Tenderneſſe* of the *Teeth*. 688

THe *Teeth* are more, by *Cold Drinke*, or the like, affected, than the other *Parts*. The *Cauſe* is double: The One, for that the *Reſiſtance* of *Bone* to *Cold*, is greater than of *Fleſh*; for that the *Fleſh* ſhrinketh, but the *Bone* reſiſteth, whereby the *Cold* becommeth more eager: The Other is, for that the *Teeth* are *Parts* without *Bloud*, Whereas *Bloud* helpeth to qualifie the *Cold*: And therefore we ſee, that the *Sinnewes* are much affected with *Cold*; For that they are *Parts* without *Bloud*: So the *Bones* in Sharpe *Colds* wax *Brittle*; And therefore it hath beene ſeene, that all *Contuſions* of *Bones*, in *Hard Weather*, are more difficult to Cure.

Experiment Solitary touching the *Tongue*. 689

IT hath beene noted, that the *Tongue* receiueth, more eaſily, *Tokens* of *Diſeaſes*, than the other *Parts*; As of *Heats* within, which appeare moſt in the *Blackneſſe* of the *Tongue*. Againe, *Pied Cattell* are ſpotted in their *Tongues*, &c. The *Cauſe* is (no doubt,) the *Tenderneſſe* of the *Part*; which thereby receiueth more eaſily all *Alterations*, than any other *Parts* of the *Fleſh*.

Experiment Solitary touching the *Taſte* 690

WHen the *Mouth* is out of *Taſte*, it maketh Things taſte, ſometimes *Salt*; Chiefly *Bitter*; And ſometimes *Loathſome*; But neuer *Sweet*. The *Cauſe* is, the *Corrupting* of the *Moiſture* about the *Tongue*; Which many times turneth *Bitter*, and *Salt*, and *Loathſome*; But *Sweet* neuer; For the reſt are *Degrees* of *Corruption*.

Experiment Solitary touching ſome *Prognoſticks* of *Peſtilentiall Seaſons*. 691

IT was obſerued in the *Great Plague* of the laſt Yeare, that there were ſeene, in diuers *Ditches*, and low *Grounds* about *London*, many *Toads*, that had *Tailes*, two or three Inches long, at the leaſt: Whereas *Toads* (vſually) haue no *Tailes* at all. Which argueth a great Diſpoſition to *Putrefaction* in the *Soile*, and *Aire*. It is reported likewiſe, that *Roots*, (ſuch as *Carrets*, and *Parſnips*,) are more *Sweet*, and *Luſhious*, in Infectious Yeares, than in other Yeares.

Experiment Solitary touching *Speciall Simples* for *Medicines*. 692.

WIſe *Phyſitians* ſhould with all diligence inquire, what *Simples* Nature yeeldeth, that haue extreme *Subtile Parts*, without any *Mordication*, or *Acrimony*: For they Vndermine that which is *Hard*; They open that which is *Stopped*, And *Shut*; and they expell that which is *Offenſiue*, gently, without too much *Perturbation*. Of this Kinde are *Elder-Flowers*, which therefore are Proper for the *Stone*: Of this kinde is

is the *Dwarfe-Pine*; which is Proper for the *Iaundies*: Of this kinde is *Harts-Horne*; which is Proper for *Agues*, and *Infections*: Of this kinde is *Peony*, which is Proper for *Stoppings* in the *Head*: Of this kind is *Fumitory*; which is Proper for the *Spleene*: And a Number of Others. Generally, diuers *Creatures* bred of *Putrifaction*, though they be somewhat loathsome to take, are of this kinde; As *Earth-wormes*, *Timber-Sowes*, *Snailes*, &c. And I conceiue, that the *Trochischs* of *Vipers*, (which are so much magnified,) and the *Flesh* of *Snakes* some waies conduted, and corrected, (which of late are growne into some Credit,) are of the same Nature. So the *Parts* of *Beasts Putrified*; (as *Castoreum*, and *Muske*, which haue extreme *Subtill Parts*,) are to be placed amongst them. We see also that *Putrifactions* of *Plants*, (as *Agaricke*, and *Iewes-Eare*,) are of greatest Vertue. The *Cause* is, for that *Putrifaction* is the Subtilleſt of all *Motions*, in the *Parts* of *Bodies*: And since we cannot take downe the *Liues* of *Liuing Creatures*, (which some of the *Paracelsians* say (if they could be taken downe,) would make vs *Immortall*;) the Next is for *Subtilty* of *Operation*, to take *Bodies Putrified*; Such as may be safely taken.

Experiments in Consort touching *Venus*. 693

IT hath beene obserued by the *Ancients*, that *Much Vse* of *Venus* doth *Dimme* the *Sight*; And yet *Eunuchs*, which are vnable to generate, are (neuertheleſſe) also *Dimme Sighted*. The *Cause* of *Dimneſſe* of *Sight*, in the Former, is the *Expence* of *Spirits*: In the Latter, the *Ouer-moiſture* of the *Braine*: For the *Ouer-moiſture* of the *Braine* doth thicken the *Spirits Visuall*, and obstructeth their Passages; As we see by the Decay, in the *Sight*, in *Age*; Where also the *Diminution* of the *Spirits* concurreth as another *Cause*: wee see also that *Blindneſſe* commeth by *Rheumes*, and *Cataracts*. Now in *Eunuchs*, there are all the Notes of *Moiſture*; As the Swelling of their Thighes, the Looseneſſe of their Belly, the Smoothneſſe of their Skinne, &c.

694

The *Pleasure* in the *Act of Venus* is the greatest of the *Pleasures* of the *Senses*: The Matching of it with *Itch* is vnproper; though that also be Pleasing to the touch. But the *Causes* are Profound. First, all the *Organs* of the *Senses* qualifie the *Motions* of the *Spirits*; And make so many seuerall *Species* of *Motions*, and *Pleasures* or *Displeasures* thereupon, as there be *Diuersities* of *Organs*. The *Instruments* of *Sight*, *Hearing*, *Taste*, and *Smell*, are of seuerall frame; And so are the Parts for Generation. Therefore *Scaliger* doth well, to make the *Pleasure* of *Generation* a *Sixth Sense*; And if there were any other differing *Organs*, and Qualified *Perforations*, for the *Spirits* to passe; there would be more than the *Fiue Senses*: Neither doe we well know whether some *Beasts*, and *Birds*, haue not *Senses* that wee know not: And the very *Sent* of *Dogges* is almost a *Sense* by it selfe. Secondly, the *Pleasures* of the *Touch*, are greater and deeper than those of the other *Senses*; As wee see in *Warming* vpon *Cold*; Or *Refrigeration* vpon *Heat*: For as the *Paines* of the *Touch*, are greater than the *Offences* of other *Senses*; So likewise are the *Pleasures*. It is true, that the *Affecting* of the *Spirits immediately*, and (as it were) without an

Organ,

Organ, is of the greatest *Pleasure*; Which is but in two things: *Sweet Smells*; And *wine*, and the like *Sweet Vapours*. For *Smells*, wee see their great and sudden Effect in fetching *Men* againe, when they swoune: For *Drinke*, it is certain, that the *Pleasure* of *Drunkennesse*, is next the *Pleasure* of *Venus*: And *Great Ioyes* (likewise) make the *Spirits* moue, and touch themselues: And the *Pleasure of Venus* is somewhat of the same Kind.

695 It hath beene alwaies obserued, that *Men* are more inclined to *Venus* in the *Winter*, and *women* in the *Summer*. The *Cause* is, for that the *Spirits* in a Body more Hot and dry, (as the *Spirits* of *Men* are,) by the *Summer* are more exhaled, and dissipated; And in the *Winter* more condensed, and kept entire: But in *Bodies* that are Cold and Moist, (as *Womens* are,) the *Summer* doth Cherish the *Spirits*, and calleth them forth; the *Winter* doth dull them. Furthermore, the *Abstinence*, or *Intermission* of the *Vse* of *Venus*, in *Moist* and *well Habituate Bodies*, breedeth a *Number* of *Diseases*; And especiall dangerous *Impostumations*. The Reason is euident; For that it is a Principall *Euacuation*, especially of the *Spirits*: For of the *Spirits*, there is scarce any *Euacuation*, but in *Venus*, and *Exercise*. And therefore the *Omission* of either of them, breedeth all *Diseases* of *Repletion*.

Experiments in Consort touching the *Insecta*.

The *Nature* of *Viuification* is very worthy the Enquiry: And as the *Nature* of *Things*, is commonly better perceiued, in Small, than in Great; and in vnperfect, than in perfect; and in Parts, than in whole: So the Nature of *Viuification* is best enquired in *Creatures* bred of *Putrefaction*. The *Contemplation* whereof hath many *Excellent Fruits*. First, in *Discloſing* the *Originall* of *Viuification*. Secondly, in *Discloſing* the *Originall* of *Figuration*. Thirdly, in *Discloſing* many *Things* in the *Nature* of *Perfect Creatures*, which in them lye more hidden. And Fourthly, in *Traducing*, by way of *Operation*, some *Obseruations* in the *Insecta*, to worke *Effects* vpon *Perfect Creatures*. Note that the word *Insecta*, agreeth not with the Matter, but we euer vse it for Breuities sake, intending by it *Creatures bred of Putrefaction*.

696 The *Insecta* are found to breed out of seuerall *Matters*: Some breed of *Mud* or *Dung*; As the *Earth-Wormes*, *Eeles*, *Snakes*, &c. For they are both *Putrefactions*: For *Water* in *Mud* doth Putrifie, as not able to Preserue it selfe: And for *Dung*, all *Excrements* are the *Refuse* and *Putrefactions* of *Nourishment*. Some breed in *Wood*, both Growing, and Cut down. *Quære* in what *woods* most, and at what Seasons? We see that the *Worms* with many Feet, which round themselues into Balls, are bred chiefly vnder *Logs* of *Timber*, but not in the *Timber*; And they are said to be found also, (many times,) in *Gardens*, where no *Logs* are. But it seemeth their

Generation

Generation requireth a *Couerture*, both from *Sunne*, and *Raine*, or *Dew*; As the *Timber* is; And therfore they are not *Venomous*, but (contrariwise) are held by the *Phyſitians* to clarifie the *Blood*. It is obſerued alſo that *Cimices* are found in the *Holes* of *Bed-ſides*. Some breed in the *Haire* of *Liuing-Creatures*; As *Lice*, and *Tikes*; which are bred by the *Sweat* cloſe kept, and ſomewhat arefied by the *Haire*. The *Excrements* of *Liuing Creatures*, doe not only breed *Inſecta*, when they are Excerned, but alſo while they are in the *Body*; As in *Wormes*, whereto Children are moſt ſubiect, and are chiefly in the Guts. And it hath beene lately obſerued by *Phyſitians*, th it in many *Peſtilent Diſeaſes*, there are *wormes* found in the vpper Parts of the Body, where *Excrements* are not, but only *Humours Putrified*. *Fleas* breed principally of *Straw* or *Mats*, where there hath beene a little *Moiſture*; Or the *Chamber* and *Bed-Straw* kept cloſe and not Aired. It is receiued that they are killed by Strewing *Wormewood* in the *Rooms*. And it is truly obſerued, that *Bitter Things* are apt, rather to kil, than engender *Putrifaction*; And they be things that are *Fat* or *Sweet*, that are apteſt to *Putrifie*. There is a *worme*, that breedeth in *Meale*, of the ſhape of a large white *Magget*, which is giuen as a great Dainty to *Nightingales*. The *Moath* breedeth vpon *Cloth*, and other *Lanifices*; Eſpecially if they be laid vp dankiſh, and wet. It delighteth to be about the *Flame* of a *Candle*. There is a *worme* called a *Weuill*, bred vnder *Ground*, and that feedeth vpon *Roots*; As *Parſnips*, *Carrets*, &c. Some breed in *Waters*, eſpecially ſhaded, but they muſt be *Standing-Waters*; As the *Water-Spider*, that hath ſix Legs. The *Fly* called the *Gad-fly*, breedeth of ſomewhat that Swimmeth vpon the Top of the *Water*, and is moſt about *Ponds*. There is a *worme* that breedeth of the *Dregs* of *Wine Decayed*; which afterwards, (as is obſerued by ſome of the *Ancients*) turneth into a *Gnat*. It hath bin obſerued by the *Ancients*, that there is a *Worme* that breedes in old *Snow*; and is of Colour Reddiſh, and dull of Motion, and dieth ſoone after it commeth out of *Snow*. Which ſhould ſhew, that *Snow* hath in it a ſecret *Warmth*; For elſe it could hardly Viuifie. And the Reaſon of the Dying of the *worme*, may be the ſudden Exhaling of that little *Spirit*, as ſoone as it commeth out of the *Cold*, which had ſhut it in. For as *Butter-flies* quicken with *Heat*, which were benummed with *Cold*; So *Spirits* may exhale with *Heat*, which were Preſerued in *Cold*. It is affirmed both by *Ancient* and *Moderne Obſeruation*, that in *Furnaces* of *Copper*, and *Braſſe*, where *Chalcites*, (which is *Vitriol*.) is often caſt in, to mend the working, there riſeth ſuddenly a *Fly*, which ſometimes moueth, as if it tooke hold on the walls of the *Furnace*; Sometimes is ſeene mouing in the *Fire* below; And dieth preſently, as ſoone as it is out of the *Furnace*. Which is a Noble *Inſtance*, and worthy to be weighed; for it ſheweth that as well *Violent Heat* of *Fire*, as the *Gentle Heat* of *Liuing Creatures*, will Viuifie, if it haue matter Proportionable. Now the great *Axiome* of *Viuification* is, that there muſt be *Heat* to dilate the *Spirit* of the *Body*; An *Actiue Spirit* to be dilated; *Matter Viſcous* or *Tenacious*, to hold in the *Spirit*; And that *Matter* to be *put forth* and *Figured*. Now a *Spirit* dilated by ſo ardent a

Fire;

Fire, as that of the *Furnace*, as ſoone as euer it cooleth neuer ſo little, congealeth preſently. And (no doubt) this *Action* is furthered by the *Chalcites*, which hath a *Spirit*, that will put forth and germinate, as we ſee in *Chymicall* Trialls. Briefly, moſt *Things Putrified* bring forth *Inſecta* of ſeuerall Names; But we will not take vpon vs now, to Enumerate them all.

697 The *Inſecta* haue beene noted by the *Ancients*, to feed little: But this hath not beene diligently obſerued; For *Graſhoppers* eat vp the *Greene* of whole *Countries*; And *Silke-wormes* deuoure leaues ſwiftly; And *Ants* make great Prouiſion. It is true, that *Creatures*, that Sleep and reſt much, Eat little; As *Dormiſe*, and *Bats*, &c. They are all without *Blood*: Which may be, for that the *Iuyce* of their *Bodies*, is almoſt all one; Not *Blood*, and *Fleſh*, and *Skin*, and *Bone*, as in *Perfect Creatures*; The *Integrall Parts* haue Extreme Varietie, but the *Similar Parts* little. It is true, that they haue, (ſome of them,) a *Diaphragme*, and an *Inteſtine*, And they haue all *Skins*; Which in moſt of the *Inſecta* are caſt often. They are not (generally) of *Long Life*: Yet *Bees* haue beene knowne to liue ſeuen yeares: And *Snakes* are thought, the rather for the *Caſting* of their *Spoile*, to liue till they be Old: And *Eeles*, which many times breed of *Putrifaction*, will liue and grow very long: And thoſe that Enterchange from *Wormes* to *Flyes* in the *Summer*, and from *Flies* to *Wormes* in the *Winter*, haue beene kept in Boxes foure years at the leaſt. Yet there are certaine *Flies*, that are called *Ephemera*, that liue but a day. The *Cauſe* is, the Exility of the *Spirit*; Or perhaps the Abſence of the *Sunne*; For that if they were brought in, or kept cloſe, they might liue longer. Many of the *Inſecta*, (as *Butterflies*, and other *Flies*,) reuiue eaſily, when they ſeeme deed, being brought to the *Sunne*, or *Fire*. The *Cauſe* whereof is, the *Diffuſion* of the *Vitall Spirit*, and the *Eaſie Dilating* of it by a little *Heat*. They ſtirre a good while after their *Heads* are off, or that they be cut in Peeces; which is cauſed alſo, for that their *Vitall Spirits* are more diffuſed thorow-out all their *Parts*, and leſſe confined to *Organs*, than in *Perfect Creatures*.

698 The *Inſecta* haue *Voluntary Motion*, and therefore *Imagination*; And whereas ſome of the *Ancients* haue ſaid that their *Motion* is Indeterminate, and their *Imagination* Indefinite, it is negligently obſerued; For *Ants* goe rightly forwards to their Hills; And *Bees* doe (admirably) know the way, from a Flowry Heath, two or three Miles off, to their Hiues. It may be *Gnats*, and *Flies*, haue their *Imagination* more mutable and giddy, as *Small Birds* likewiſe haue. It is ſaid by ſome of the *Ancients*, that they haue onely the *Senſe* of *Feeling*; which is manifeſtly vntrue: For if they goe forth-right to a Place, they muſt needs haue Sight: Beſides they delight more in one *Flower*, or *Herb*, than in another, and therefore haue *Taſte*. And *Bees* are called with *Sound* vpon *Braſſe*, and therefore they haue *Hearing*: Which ſheweth likewiſe that though their *Spirit* be diffuſed, yet there is a *Seat* of their *Senſes* in their *Head*.

Other Obſeruations *concerning the* Inſecta, *together with the* Enumeration

tion *of them, we referre to that Place, where wee meane to handle the* Title *of* Animal's *in generall.*

A *Man Leapeth* better with *Weights*, in his *Hands*, than without. The *Cauſe* is, for that the *Weight*, (if it be proportionable,) ſtrengtheneth the *Sinewes*, by *Contracting* them. For otherwiſe, where no *Contraction* is needfull, *Weight* hindereth. As we ſee in *Horſe-Races*, *Men* are curious to fore-ſee, that there be not the leaſt *weight*, vpon the one *Horſe*, more than vpon the other. In *Leaping* with *Weights*, the *Armes* are firſt caſt backwards, and then forwards, with ſo much the greater Force: For the *Hands* goe backward before they take their Raiſe. *Quære*, if the contrary *Motion* of the *Spirits*, immediately before the *Motion* wee intend, doth not cauſe the *Spirits*, as it were, to breake forth with more Force: As *Breath* alſo drawen, and kept in, commeth forth more forcibly: And in *Caſting* of any *Thing*, the *Armes*, to make a greater Swing, are firſt caſt backward.

Experiment Solitary touching *Leaping.* 699

OF *Muſicall Tones*, and *Vnequall Sounds*, wee haue ſpoken before; But touching the *Pleaſure*, and *Diſpleaſure* of the *Senſes*, not ſo fully. *Harſh Sounds*, as of a *Saw*, when it is ſharpened; *Grinding* of one *Stone* againſt another; *Squeaking*, or *Skriching Noiſe*; make a *Shiuering* or *Horrour* in the *Body*, and ſet the *Teeth* on edge. The *Cauſe* is, for that the *Obiects* of the *Eare*, doe affect the *Spirits* (immediately) moſt with *Pleaſure* and Offence. We ſee, there is no *Colour* that affecteth the *Eye* much with *Diſpleaſure*: There be *Sights*, that are *Horrible*, becauſe they excite the *Memory* of *Things* that are *Odious*, or *Fearefull*; But the ſame *Things Painted* doe little affect. As for *Smells*, *Taſtes*, and *Touches*, they be *Things* that doe affect, by a *Participation*, or *Impulſion* of the *Body*, of the *Obiect*. So it is *Sound* alone, that doth immediately, and incorporeally, affect moſt: This is moſt manifeſt in *Muſicke*; and *Concords* and *Diſcords* in *Muſicke*: For all *Sounds*, whether they be ſharpe, or Flat, if they be Sweet, haue a Roundneſſe and *Equalitie*; And if they bee Harſh, are *Vnequall*: For a *Diſcord* it ſelfe is but a *Harſhneſſe* of *Diuers Sounds Meeting*. It is true, that *Inequality*, not Stayed vpon, but Paſſing, is rather an Encreaſe of *Sweetneſſe*; As in the *Purling* of a *Wreathed String*; And in the *Raucitie* of a *Trumpet*; And in the *Nightinghale-Pipe* of a *Regall*; And in a *Diſcord* ſtraight falling vpon a *Concord*: But if you ſtay vpon it, it is *Offenſiue*; And therefore, there be theſe three *Degrees* of *Pleaſing* and *Diſpleaſing* in *Sounds*; *Sweet Sounds*; *Diſcords*; *and Harſh Sounds*, which wee call by diuers Names, as *Skriching*, or *Grating*, ſuch as we now ſpeake of. As for the *Setting* of the *Teeth* on *Edge*, we ſee plainly, what an Intercourſe there is, between the *Teeth*, and the *Organ* of the *Hearing*, by the Taking of the End of a Bow, betweene the *Teeth*, and *Striking* vpon the *String*.

Experiment Solitary touching the *Pleaſures*, and *Diſpleaſures* of the *Senſes*, eſpecially of *Hearing.* 700

NATV-

NATVRALL HISTORIE.

VIII. Century.

THere be *Minerals*, and *Fossiles*, in great Varietie; But of *Veines* of *Earth Medicinall*, but few; The chiefe are, *Terra Lemnia*, *Terra Sigillata communis*, and *Bolus Armenus*: Whereof *Terra Lemnia* is the Chiefe. The *Vertues* of them are, for *Curing* of *Wounds*, *Stanching* of *Bloud*, *Stopping* of *Fluxes* and *Rheumes*, and *Arresting* the *Spreading* of *Poyson*, *Infection*, and *Putrifaction*: And they haue, of all other *Simples*, the Perfectest and Purest *Quality* of *Drying*, with little or no Mixture of any other *Quality*. Yet it is true, that the *Bole-Armenicke* is the most *Cold* of them; And that *Terra Lemnia* is the most *Hot*; For which Cause, the *Island Lemnos*, where it is digged, was in the Old *Fabulous Ages* consecrated to *Vulcan*.

Experiment Solitary touching *Veines* of *Medicinall Earth*. 701

ABout the bottome of the *Straights* are gathered great Quantities of *Sponges*, which are gathered from the sides of *Rockes*, being as it were a large, but tough *Mosse*. It is the more to be noted, because that there be but few *Substances*, *Plant-like*, that grow deep within the *Sea*; For they are gathered sometimes fifteen Fathom deep; And when they are laid

Experiment Solitary touching the *Growth* of *Sponges*. 702

laid on Shore, they seeme to be of great Bulke; But crushed together, will be transported in a very small Roome.

Experiment Solitary touching *Sea-Fish*, put in *Fresh Waters*. 703

IT seemeth, that *Fish*, that are vsed to the *Salt-water*, doe neuerthelesse delight more in *Fresh*. We see, that *Salmons*, and *Smelts*, loue to get into *Riuers*, though it be against the *Streame*. At the *Hauen* of *Constantinople*, you shall haue great *Quantities* of *Fish* that come from the *Euxine Sea*; that when they come into the *Fresh Water*, do inebriate and turne vp their *Bellies*; So as you may take them with your Hand. I doubt there hath not been sufficient *Experiment* made of Putting *Sea-Fish* into *Fresh-Water*, *Ponds*, and *Pooles*. It is a thing of great Vse, and Pleasure: For so you may haue them new at some good distance from the *Sea*: And besides, it may be, the *Fish* will eat the pleasanter, and may fall to breed, And it is said, that *Colchester Oysters*, which are put into Pits, where the *Sea* goeth and commeth (but yet so, that there is a *Fresh-Water* also comming to them, when the *Sea* voideth,) become by that meanes Fatter, and more Growne.

Experiment Solitary touching *Attraction* by *Similitude* of *Substance*. 704

THe *Turkish-Bow* giueth a very Forcible *Shoot*; Insomuch as it hath bin known, that the *Arrow* hath pierced a *Steele Target*, or a Peece of *Brasse* of two Inches thicke: But that which is more strange, the *Arrow*, if it be Headed with *wood*, hath beene knowne to pierce thorow a Peece of *wood*, of eight Inches thicke. And it is certaine, that we had in vse at one time, for *Sea-Fight*, short *Arrowes*, which they called *Sprights*, without any other Heads, saue *Wood* sharpned; which were discharged out of *Muskets*, and would pierce thorow the sides of *Ships*, where a *Bullet* would not pierce. But this dependeth vpon one of the greatest *Secrets* in all *Nature*; Which is, that *Similitude* of *Substance* will cause *Attraction*, where the Body is wholly freed from the *Motion* of *Grauity*: For if that were taken away, *Lead* would draw *Lead*, and *Gold* would draw *Gold*, and *Iron* would draw *Iron*, without the helpe of the *Load-Stone*. But this same *Motion* of *Weight* or *Grauity* (which is a meere *Motion* of the *Matter*, and hath no Affinity with the *Forme* or *Kinde*,) doth kill the other *Motion*, except it selfe be killed by a violent *Motion*; As in these *Instances* of *Arrowes*; For then the *Motion* of *Attraction* by *Similitude* of *Substance*, beginneth to shew it selfe. But we shall handle this Point of *Nature* fully in due Place.

Experiment Solitary touching certaine *Drinkes* in *Turkey*. 705

THey haue in *Turkey*, and the *East*, certaine *Confections*, which they call *Seruets*, which are like to *Candied Conserues*; And are made of *Sugar* and *Limons*, or *Sugar* and *Citrons*, or *Sugar* and *Violets*, and some other Flowers; And some Mixture of *Amber* for the more delicate Persons; And those they dissolue in *Water*, and thereof make their *Drinke*, because they are forbidden *Wine* by the *Law*. But I doe much marueil, that no *Englishman*, or *Dutchman*, or *German*, doth set vp *Brewing* in *Constantinople*; Considering they haue such Quantity of *Barley*. For as for the

the generall Sort of *Men*, Frugality may be the *Cause* of *Drinking Water*; For that it is no small Saving, to pay nothing for ones *Drinke*: But the better Sort mought well be at the Cost. And yet I wonder the lesse at it, because I see *France*, *Italy*, or *Spaine*, haue not taken into vse, *Beere*, or *Ale*; Which (perhaps) if they did, would better both their Healths, and their Complexions. It is likely it would be Matter of great Gaine to any, that should begin it in *Turkey*.

Experiments in Consort, touching *Sweat*. 706

IN *Bathing* in *Hot water*, *Sweat* (neuertheless) commeth not in the *Parts* vnder the *water*. The *Cause* is; First, for that *Sweat* is a Kind of *Colliquation*. And that Kind of *Colliquation* is not made, either by an *Ouer-Dry Heat*, or an *Ouer-Moist Heat*. For *Ouer-Moisture* doth somewhat extinguish the *Heat*; As we see that euen *Hot water* quencheth *Fire*: And *Ouer-Dry Heat* shutteth the *Pores*: And therefore *Men* will sooner *Sweat* couered before the *Sunne* or *Fire*, than if they stood Naked; And *Earthen Bottles*, filled with *Hot Water*, doe prouoke, in Bed, a *Sweat* more daintily, than *Brick-bats Hot*. Secondly, *Hot water* doth cause *Euaporation* from the *Skin*; So as it spendeth the Matter, in those Parts vnder the *water*, before it issueth in *Sweat*. Againe, *Sweat* commeth more plentifully, if the *Heat* be increased by *Degrees*, than if it be greatest at first, or equall. The *Cause* is; for that the *Pores* are better opened by a *Gentle Heat*, than by a more *Violent*; And by their opening, the *Sweat* issueth more abundantly. And therefore *Physitians* may doe well, when they prouoke *Sweat* in Bed, by *Bottles*, with a *Decoction* of *Sudorificke Herbs* in *Hot water*, to make two *Degrees* of *Heat* in the *Bottles*; And to lay in the Bed, the *lesse Heated* first; and after halfe an houre the *more Heated*.

Sweat is *Salt* in Taste; The *Cause* is, for that, that *Part* of the *Nourishment*, which is *Fresh* and *Sweet*, turneth into *Bloud*, and *Flesh*; And the *Sweat* is only that *Part* which is *Separate* and *Excerned*. *Bloud* also Raw, hath some *Saltnesse*, more than *Flesh*; because the *Assimilation* into *Flesh*, is not without a little and subtile *Excretion* from the *Bloud*. 707

Sweat commeth forth more out of the *Vpper Parts* of the *Body*, than the *Lower*; The *Reason* is, because those *Parts* are more replenished with *Spirits*; And the *Spirits* are they that put forth *Sweat*: Besides, they are lesse *Fleshie*, and *Sweat* issueth (chiefly) out of the *Parts* that are lesse *Fleshie*, and more *Drie*; As the *Fore-head*, and *Breast*. 708

Men *Sweat* more in *Sleepe* than *Waking*; And yet *Sleepe* doth rather stay other *Fluxions*, than cause them; As *Rheumes*, *Loosenesse* of the *Body*, &c. The *Cause* is, for that in *Sleepe*, the *Heat* and *Spirits* doe naturally moue inwards, and there rest. But when they are collected once within, the *Heat* becommeth more Violent, and Irritate; And thereby expelleth *Sweat*. 709

Cold Sweats are (many times) *Mortall*, and neere *Death*; And alwayes *Ill*, and *Suspected*; As in *Great Feares*, *Hypochondriacall Passions*, &c. The *Cause* is, for that *Cold Sweats* come by a *Relaxation* or *Forsaking* of the 710

Spirits, whereby the *Moisture* of the Body, which *Heat* did keepe firme in the *Parts*, seuereth, and issueth out.

711 In those *Diseases* which cannot be discharged by *Sweat*, *Sweat* is ill, and rather to be stayed; As in *Diseases* of the *Lungs*, and *Fluxes* of the *Belly*; But in those *Diseases*, which are expelled by *Sweat*, it easeth and lightneth; As in *Agues*, *Pestilences*, &c. The *Cause* is, for that *Sweat* in the latter Sort is partly *Critical*, and sendeth forth the *Matter* that offendeth; But in the Former, it either proceedeth from the *Labour* of the *Spirits*, which sheweth them Oppressed; Or from *Motion* of *Consent*, when *Nature* not able to expell the *Disease*, where it is seated, moueth to an *Expulsion* indifferent ouer all the *Body*.

Experiment Solitary touching the *Glo-worme*.

712 THe *Nature* of the *Glo-worme* is hitherto not well obserued. Thus much we see; That they breed chiefly in the *Hottest Moneths* of *Summer*; And that they breed not in *Champaigne*, but in *Bushes* and *Hedges*. Whereby it may be conceiued, that the *Spirit* of them is very fine, and not to be refined but by *Summer Heats*: And againe, that by reason of the Fineness, it doth easily exhale. In *Italy*, and the *Hotter Countries*, there is a *Flie* they call *Lucciole*, that shineth as the *Glo-worme* doth; And it may be is the *Flying Glo-worme*. But that *Fly* is chiefly vpon *Fens*, and *Marrishes*. But yet the two former *Obseruations* hold; For they are not seene but in the *Heat* of *Summer*; And *Sedge*, and other *Greene* of the *Fens*, giue as good Shade, as *Bushes*. It may be the *Glo-wormes* of the *Cold Countries* ripen not so farre as to be *winged*.

Experiments in Consort, touching the *Impressions*, which the *Passions* of the *Minde* make vpon the *Body*.

713 THe *Passions* of the *Minde*, worke vpon the *Body* the *Impressions* following. *Feare* causeth *Paleness*; *Trembling*, The *Standing* of the *Haire vpright*; *Starting*; and *Skritching*. The *Paleness* is caused, for that the *Bloud* runneth inward, to succour the *Heart*. The *Trembling* is caused, for that through the *Flight* of the *Spirits* inward, the *Outward Parts* are destituted, and not sustained. *Standing Vpright* of the *Haire* is caused, for that by the *Shutting* of the *Pores* of the *skin*, the *Haire* that lieth asloape, must needs Rise. *Starting* is both an *Apprehension* of the *Thing feared*; (And, in that Kinde, it is a *Motion* of *Shrinking*;) And likewise an *Inquisition*, in the beginning, what the Matter should be; (And in that kinde it is a *Motion* of *Erection*;) And therefore when a *Man* would listen suddenly to any Thing, he *Starteth*; For the *Starting* is an *Erection* of the *Spirits* to attend. *Skritching* is an *Appetite* of *Expelling* that which suddenly striketh the *Spirits*: For it must be noted, that many *Motions* though they be vnprofitable to expell that which hurteth, yet they are *Offers* of *Nature*, and cause *Motions* by *Consent*; As in *Groaning*, or *Crying* vpon *Paine*.

714 *Griefe* and *Paine* cause *Sighing*; *Sobbing*; *Groaning*; *Screaming*; and *Roaring*; *Teares*; Distorting of the *Face*; *Grinding* of the *Teeth*; *Sweating*. *Sighing* is caused by the drawing in of a greater *Quantity* of *Breath* to refresh the *Heart* that laboureth: like a great *Draught* when one is thirsty.

Sobbing

Sobbing is the same Thing stronger. *Groaning*, and *Screaming*, and *Roaring*, are caused by an *Appetite* of *Expulsion*, as hath beene said: For when the *Spirits* cannot expell the Thing that hurteth, in their strife to do it, by *Motion* of *Consent*, they expell the *Voice*. And this is, when the *Spirits* yeeld, and giue ouer to resist; For if one doe constantly resist *Paine*, he will not groane. *Teares* are caused by a *Contraction* of the *Spirits* of the *Braine*; Which *Contraction* by consequence astringeth the *Moisture* of the *Braine*; and thereby sendeth *Teares* into the *Eyes*. And this *Contraction*, or *Compression* causeth also *Wringing* of the *Hands*; For *Wringing* is a *Gesture* of *Expression*, of *Moisture*. The *Distorting* of the *Face* is caused by a *Contention*, first to bear and resist, and then to expell. Which maketh the Parts knit first, and afterwards open. *Grinding* of the *Teeth* is caused (likewise) by a *Gathering* and *Serring* of the *Spirits* together to resist; Which maketh the *Teeth* also to set hard one against another. *Sweating* is also a *Compound Motion* by the *Labour* of the *Spirits*; first to resist; and then to expell.

Ioy causeth a *Chearefulnesse*, and *Vigour* in the *Eyes*; *Singing*; *Leaping*; 715
Dancing; And sometimes *Teares*. All these are the *Effects* of the *Dilatation*, and *Comming* forth of the *Spirits* into the *Outward Parts*; Which maketh them more *Liuely*, and *Stirring*. We know it hath beene seene, that *Excessiue sudden Ioy*, hath caused *Present Death*, while the *Spirits* did spread so much, as they could not retire againe. As for *Tearcs*, they are the Effects of *Compression* of the *Moisture* of the *Braine*, vpon *Dilatation* of the *Spirits*. For *Compression* of the *Spirits* worketh an *Expression* of the *Moisture* of the *Braine*, by *Consent*, as hath beene said in *Griefe*. But then in *Ioy*, it worketh it diuersly; *viz.* by *Propulsion* of the *Moisture*, when the *Spirits* dilate, and occupy more Roome.

Anger causeth *Paleneſſe* in some, and the *Going* and *Comming of the* 716
Colour in Others: Also *Trembling* in some; *Swelling*; *Foaming* at the *Mouth*; *Stamping*; *Bending* of the *Fist*. *Paleneſſe*, and *Going*, and *Comming* of the *Colour*, are caused by the *Burning* of the *Spirits* about the *Heart*; Which to refresh themselues call in more *Spirits* from the *Outward Parts*. And if the *Paleneſſe* be alone, without *Sending forth* the *Colour* againe, it is commonly ioyned with some *Feare*; But in many there is no *Paleneſſe* at all, but contrariwise *Redneſſe* about the *Cheekes*, and *Gils*; Which is by the *Sending forth* of the *Spirits* in an *Appetite* to *Reuenge*. *Trembling* in *Anger* is likewise by a *Calling* in of the *Spirits*; And is commonly, when *Anger* is ioyned with *Feare*. *Swelling* is caused, both by a *Dilatation* of the *Spirits* by *Ouer-Heating*, and by a *Liquefaction* or *Boyling* of the *Humours* thereupon. *Foaming* at the *Mouth* is from the same *Cause*, being an *Ebullition*. *Stamping*, and *Bending* of the *Fist*, are caused by an *Imagination* of the *Act* of *Reuenge*.

Light Displeasure or *Dislike*, causeth *Shaking* of the *Head*; *Frowning*, 717
and *Knitting* of the *Brows*. These *Effects* arise from the same *Causes* that *Trembling*, and *Horrour* doe; Namely, from the *Retiring* of the *Spirits*, but in a lesse degree. For the *Shaking* of the *Head* is but a Slow and

Definite *Trembling*; And is a *Gesture* of *Slight Refusall*: And we see also, that a *Dislike* causeth (often) that *Gesture* of the *Hand*, which we vse when we refuse a Thing, or warne it away. The *Frowning* and *Knitting* of the *Browes*, is a *Gathering* or *Serring* of the *Spirits*, to resist in some Measure. And we see also, this *Knitting* of the *Browes*, will follow vpon earnest *Studying*, or *Cogitation* of any Thing, though it be without *Dislike*.

718 *Shame* causeth *Blushing*; And *Casting downe* of the *Eyes*. *Blushing* is the *Resort* of *Bloud* to the *Face*; Which in the *Passion* of *Shame* is the *Part* that laboureth most. And although the *Blushing* will be seen in the whole *Breast*, if it be Naked, yet that is but in Passage to the *Face*. As for the *Casting downe* of the *Eyes*, it proceedeth of the *Reuerence* a Man beareth to other Men; Whereby, when he is ashamed, he cannot endure to looke firmely vpon Others: And we see that *Blushing*, and the *Casting downe* of the *Eyes* both, are more when we come before Many; *Ore Pompeij, quid mollius? Nunquàm non coram pluribus erubuit:* And likewise when we come before *Great*, or *Reuerend Persons*.

719 *Pity* causeth sometimes *Teares*; And a *Flexion* or *Cast* of the *Eye aside*. *Teares* come from the same *Cause* that they doe in *Griefe*; for *Pity* is but *Griefe* in anothers Behalfe. The *Cast* of the *Eye* is a *Gesture* of *Auersion*, or *Lothnesse* to behold the *Obiect* of *Pity*.

720 *Wonder* causeth *Astonishment*, or an *Immoueable Posture* of the *Body*; *Casting* vp of the *Eyes* to *Heauen*, And *Lifting* vp of the *Hands*. For *Astonishment*, it is caused by the *Fixing* of the *Minde* vpon one *Obiect* of *Cogitation*, whereby it doth not spatiate and transcurre, as it vseth: For in *wonder* the *Spirits* flie not, as in *Feare*; But onely settle, and are made lesse apt to moue. As for the *Casting* vp of the *Eyes*, and *Lifting* vp of the *Hands*, it is a *Kinde* of *Appeale* to the *Deity*; Which is the *Author*, by *Power*, and *Prouidence*, of *Strange Wonders*.

721 *Laughing* causeth a *Dilatation* of the *Mouth*, and *Lips*; A *Continued Expulsion* of the *Breath*, with the loud *Noise*, which maketh the *Interiection* of *Laughing*; *Shaking* of the *Breast*, and *Sides*; *Running* of the *Eies* with *water*, if it be Violent, and Continued. Wherein first it is to bee vnderstood, that *Laughing* is scarce (properly) a *Passion*, but hath his *Source* from the *Intellect*; For in *Laughing* there euer precedeth a *Conceit* of somewhat *Ridiculous*. And therefore it is Proper to *Man*. Secondly, that the *Cause* of *Laughing* is but a *Light Touch* of the *Spirits*, and not so deepe an *Impression* as in other *Passions*. And therefore (that which hath no *Affinity* with the *Passions* of the *Minde*) it is moued, and that in great vehemency, only by *Tickling* some *Parts* of the *Body*: And we see that *Men* euen in a *Grieued State* of *Minde*, yet cannot sometimes forbeare *Laughing*. Thirdly, it is euer ioyned with some *Degree* of *Delight*: And therefore *Exhilaration* hath some *Affinity* with *Ioy*, though it be a much *Lighter Motion*: *Res seuera est verum Gaudium*. Fourthly, that the *Obiect* of it is *Deformity*, *Absurdity*, *Shrewd Turnes*, and the like. Now to speake of the *Causes* of the *Effects* before mentioned, whereunto these

Generall

Generall Notes giue some *Light*. For the *Dilatation* of the *Mouth* and *Lips*, *Continued Expulsion* of the *Breath* and *Voice*, and *Shaking* of the *Breast* and *Sides*, they proceed(all) from the *Dilatation* of the *Spirits*; Especially being Sudden. So likewise, the *Running* of the *Eyes* with *Water*, (as hath beene formerly touched, where we spake of the *Teares* of *Ioy* and *Griefe*;) is an Effect of *Dilatation* of the *Spirits*. And for *Suddennesse*, it is a great *Part* of the *Matter*: For we see, that any *Shrew'd Turne* that lighteth vpon Another; Or any *Deformitie*, &c. moueth *Laughter* in the Instant; Which after a little time it doth not. So we cannot *Laugh* at any Thing after it is *Stale*, but whilest it is *New*: And euen in *Tickling*, if you *Tickle* the *Sides*, and giue warning; Or giue a *Hard* or *Continued Touch*, it doth not moue *Laughter* so much.

Lust causeth a *Flagrancie* in the *Eyes*; and *Priapisme*. The *Cause* of both these is, for that in *Lust*, the *Sight*, and the *Touch*, are the Things desired: And therefore the *Spirits* resort to those parts, which are most affected. And note well in generall, (For that great Vse may be made of the *Obseruation*,) that (euermore) the *Spirits*, in all *Passions*, resort most to the *Parts*, that labour most, or are most affected. As in the last, which hath beene mentioned, they resort to the *Eyes*, and *Venereous Parts*: In *Feare*, and *Anger*, to the *Heart*: In *Shame* to the *Face*: And in *Light dislikes* to the *Head*. 722

IT hath beene obserued by the *Ancients*, and is yet beleeued, that the *Sperme* of *Drunken Men* is *Vnfruitfull*. The *Cause* is, for that it is *Ouermoistened*, and wanteth *Spissitude*. And wee haue a merry Saying, that they that goe *Drunke* to *Bed*, get *Daughters*. Experiments in Consort touching *Drunkennesse*. 723

Drunken Men are taken with a plaine *Deffect*, or *Destitution* in *Voluntary Motion*. They Reele; They tremble; They cannot stand, nor speake strongly. The *Cause* is, for that the *Spirits* of the *Wine*, oppresse the *Spirits Animall*, and occupate Part of the Place, where they are; And so make them Weake to moue. And therefore *Drunken Men* are apt to fall asleepe: And *Opiates*, and *Stupefactiues*, (as *Poppie*, *Henbane*, *Hemlocke*, &c.) induce a kinde of *Drunkennesse*, by the *Grossenesse* of their *Vapour*; As *Wine* doth by the *Quantitie* of the *Vapour*. Besides, they rob the *Spirits Animall* of their *Matter*, whereby they are nourished: For the *Spirits* of the *Wine* prey vpon it, as well as they: And so they make the *Spirits* lesse Supple, and Apt to moue. 724

Drunken Men imagine euery *Thing turneth round*; They imagine also that *Things Come vpon them*; They *See* not well *Things a farre off*; Those Things that they *See neare hand*, they *See out of their Place*; And (sometimes) they *see Things double*. The *Cause* of the Imagination that *Things turne round*, is, for that the *Spirits* themselues turne, being compressed by the *Vapour* of the *Wine*: (For any *Liquid Body* vpon *Compression*, turneth, as we see in *Water*:) And it is all one to the *Sight*, whether the *Visuall Spirits* moue, or the *Obiect* moueth, or the *Medium* moueth. And wee see that long *Turning Round* breedeth the same Imagination. 725

The

The *Cause* of the Imagination that *Things come upon them*, is, for that the *Spirits Visuall* themselues draw backe; which maketh the *Obiect* seeme to come on; And besides, when they see Things turne Round, and Moue, *Feare* maketh them thinke they come vpon them. The *Cause* that they cannot see *Things a farre off*, is the *Weakneſſe* of the *Spirits*; for in euery *Megrim*, or *Vertigo*, there is an *Obtenebration* ioyned with a Semblance of *Turning round*; Which we see also in the lighter Sort of *Swounings*. The *Cause* of *Seeing things out of their Place*, is the *Refraction* of the *Spirits Visuall*; For the *Vapour* is as an *Vnequall Medium*; And it is, as the Sight of Things, out of place, in *Water*. The *Cause* of *Seeing Things double*, is, the *Swift* and *Vnquiet Motion* of the *Spirits*, (being Oppreſſed,) to and fro; For, (as was said before,) the *Motion* of the *Spirits Visuall*, and the *Motion* of the *Obiect*, make the same *Appearances*; And for the *Swift Motion* of the *Obiect*, we see, that if you fillip a *Lute-string*, it sheweth double, or Treble.

726 *Men* are sooner *Drunke* with *Small Draughts*, than with *Great*. And againe, *Wine Sugred* inebriateth leſſe, than *Wine Pure*. The *Cause* of the Former is, for that the *Wine* descendeth not so fast to the *Bottome* of the *Stomach*; But maketh longer Stay in the *Vpper Part* of the *Stomach*, and sendeth *Vapours* faster to the *Head*; And therefore inebriateth sooner. And, for the same Reason, *Sops* in *Wine*; (Quantitie for Quantitie,) inebriate more, than *Wine* of it selfe. The *Cause* of the Latter is, for that the *Sugar* doth inspiſſate the *Spirits* of the *Wine*, and maketh them not so easie to resolue into *Vapour*. Nay further, it is thought to bee some Remedie against *Inebriating*, if *Wine Sugred* be taken after *Wine Pure*. And the same Effect is wrought either by *Oyle*, or *Milke*, taken vpon much *Drinking*.

Experiment Solitary touching the *Helpe* or *Hurt* of *Wine*, though *Moderately vsed*.

727 THe *Vse* of *Wine*, in *Drie*, and *Conſumed Bodies*, is hurtfull; In *Moiſt*, and *Full Bodies*, it is good. The *Cause* is, for that the *Spirits* of the *Wine* doe prey vpon the *Dew*, or *Radicall Moiſture*, (as they terme it) of the *Bodie*, and so deceiue the *Animall Spirits*. But where there is *Moiſture* Enough, or Superfluous, there *Wine* helpeth to diſgeſt, and deſiccate the *Moiſture*.

Experiment Solitary touching *Catterpillers*.

728 THe *Catterpiller* is one of the most Generall of *Wormes*, and breedeth of *Dew*, and *Leaues*: For we see infinite Number of *Catterpillers*, which breed vpon *Trees*, and *Hedges*; By which the *Leaues* of the *Trees*, or *Hedges*, are in great Part comsumed; As well by their Breeding out of the *Leafe*, as by their Feeding vpon the *Leafe*. They breed in the *Spring* chiefly, because then there is both *Dew*, and *Leafe*. And they breed commonly when the *East-Winds* haue much blowne: The *Cause* whereof is, the *Drineſſe* of that *Wind*: For to all *Viuification* vpon *Putrifaction*, it is requisite the *Matter* be not too *Moiſt*: And therefore we see, they haue *Copwebs* about them, which is a signe of a *Slimy Drineſſe*: As we see vpon the *Ground*, whereupon, by *Dew*, and *Sunne*, *Copwebs* breed all ouer.

We

Wee see also the *Greene Catterpiller* breedeth in the Inward Parts of *Roses*, especially not blowne, where the *Dew* sticketh: But especially *Catterpillers*, both the greatest and the most, breed vpon *Cabbages*, which haue a *Fat Leafe*, and apt to *Putrifie*. The *Catterpiller* towards the *End* of *Summer*, waxeth *Volatile*, and turneth to a *Butterfly*, or perhaps some other *Fly*. There is a *Catterpiller*, that hath a *Furre*, or *Downe* vpon him, and seemeth to haue Affinitie with the *Silke-worme*.

THe *Flyes Cantharides* are bred of a *Worme*, or *Catterpiller*, but peculiar to certaine *Fruit-Trees*; As are the *Fig-tree*, the *Pine-tree*, and the *Wilde Briar*; All which beare *Sweet Fruit*; And *Fruit* that hath a kinde of secret *Biting*, or *Sharpenesse*: For the *Fig* hath a *Milke* in it, that is *Sweet*, and *Corrosiue*: The *Pine-Apple* hath a *Kernell* that is *Strong* and *Abstersiue*: The *Fruit* of the *Briar* is said to make *Children*, or those that Eat them, *Scabbed*. And therefore, no maruell though *Cantharides* haue such a *Corrosiue*, and *Cauterizing Qualitie*; For there is not any other of the *Insecta*, but is bred of a *Duller Matter*. The *Body* of the *Cantharides* is bright coloured; And it may bee, that the delicate-coloured *Dragon-Flyes*, may haue likewise some *Corrosiue Quality*.

Experiment Solitary touching the *Flyes Cantharides*. 729

Lassitude is remedied by *Bathing*, or *Anointing* with *Oyle*, and *Warme Water*. The *Cause* is, for that all *Lassitude* is a kinde of *Contusion*, and *Compression* of the *Parts*; And *Bathing*, and *Anointing* giue a *Relaxation*, or *Emollition*: And the *Mixture* of *Oyle*, and *water*, is better than either of them alone; Because *Water* Entreth better into the *Pores*, and *Oyle* after Entry softneth better. It is found also that the *Taking* of *Tobacco* doth helpe and discharge *Lassitude*. The *Reason* whereof is, partly, because by Chearing or Comforting of the *Spirits*, it openeth the *Parts Compressed*, or *Contused*: And chiefly, because it refresheth the *Spirits* by the *Opiate Vertue* thereof; And so dischageth *Wearinesse*; as *Sleepe* likewise doth.

Experiments in Consort, touching *Lassitude*. 730

In *Going vp a Hill*, the *Knees* will be most *weary*; In *Going downe a Hill*, the *Thighes*. The *Cause* is, for that, in the *Lift* of the *Feet*, when a Man *Goeth vp the Hill*, the Weight of the *Body* beareth most vpon the *Knees*; And in *Going downe the Hill*, vpon the *Thighes*. 731

THe *Casting* of the *Skin*, is by the *Ancients* compared, to the *Breaking* of the *Secundine*, or *Call*; But not rightly: For that were to make euery *Casting* of the *Skin* a New *Birth*: And besides, the *Secundine* is but a generall *Couer*, not shaped according to the *Parts*; But the *Skin* is shaped according to the *Parts*. The *Creatures*, that cast their *Skin*, are; The *Snake*; the *Viper*, the *Grashopper*, the *Lizard*, the *Silke-worme*, &c. Those that cast their *Shell*, are; The *Lobster*, the *Crab*, the *Crasish*, the *Hodmandod* or *Dodman*, the *Tortoise*, &c. The *Old Skinnes* are found, but the *Old Shells* neuer: So as it is like, they scale off, and crumble away by degrees. And they are knowne by the Extreme *Tendernesse* and *Softnesse* of

Experiment Solitary touching the *Casting* of the *Skin*, and *Shell*, in some *Creatures*. 732

of the *New Shell*; And sometimes by the *Freshnesse* of the *Colour* of it. The *Cause* of the *Casting* of *Skin*, and *Shell*, should seeme to be the great *Quantitie* of *Matter* in those *Creatures*, that is fit to make *Skin*, or *Shell*. And Againe, the *Looseneſſe* of the *Skin*, or *Shell*, that sticketh not close to the *Flesh*. For it is certaine, that it is the *New Skin*, or *Shell*, that putteth off the *Old*: So we see, that in *Deere*, it is the *Young Horne*, that putteth off the *Old*; And in *Birds*, the *Young Feathers* put off the *Old*: And so *Birds*, that haue much *Matter* for their *Beake*, cast their *Beakes*; the *New Beake* Putting off the *Old*.

Experiments in Consort, touching the *Postures* of the *Bodie*.

733 *Lying*, not *Erect*, but *Hollow*, which is in the Making of the Bed; Or with the *Legs gathered vp*, which is in the Posture of the Body, is the more Wholesome. The *Reason* is, the better *Comforting* of the *Stomach*, which is by that lesse Pensile: And we see, that in Weake *Stomachs*, the Laying vp of the Legs high, and the Knees almost to the Mouth, helpeth, and comforteth. We see also that *Gally-slaues*, notwithstanding their Misery otherwise, are commonly Fat and Fleshy; And the Reason is, because the *Stomach* is supported somewhat in *Sitting*; And is Pensile in *Standing*, or *Going*. And therefore, for *Prolongation* of *Life*, it is good to choose those *Exercises*, where the *Limbs* moue more than the *Stomach*, and Belly; As in *Rowing*, and in *Sawing* being *Set*.

734 *Megrims* and *Giddinesse* are rather when we *Rise*, after long *Sitting*, than while we *Sit*. The *Cause* is, for that the *Vapours*, which were gathered by *Sitting*, by the Sudden *Motion*, fly more vp into the *Head*.

735. *Leaning long* vpon any *Part* maketh it *Numme*, and, as wee call it, Aslcepe. The *Cause* is, for that the *Compression* of the *Part* suffereth not the *Spirits* to haue free Accesse; And therefore, when wee come out of it, wee feele a *Stinging*, or *Pricking*; Which is the *Re-entrance* of the *Spirits*.

Experiment Solitary touching *Pestilentian Yeares*.

736 It hath beene noted, that those *Yeares* are *Pestilentiall*, and *Vnwholesome*, when there are great Numbers of *Frogs*, *Flies*, *Locusts*, &c. The *Cause* is plaine; For that those *Creatures* being engendred of *Putrifaction*, when they abound, shew a generall *Disposition* of the *Yeare*, and *Constitution* of the *Aire*, to *Diseases* of *Putrifaction*. And the same *Prognosticke*, (as hath beene said before,) holdeth, if you finde *Wormes* in *Oake-Apples*. For the *Constitution* of the *Aire*, appeareth more subtilly, in any of these *Things*, than to the *Sense* of *Man*.

Experiment Solitary touching the *Prognosticks* of *Hard Winters*.

737 It is an Obseruation amongst *Country-People*, that *Yeares* of *Store* of *Haws* and *Heps*, doe commonly portend *Cold Winters*; And they ascribe it to *Gods Prouidence*, that, (as the *Scripture* saith) reacheth euen to the *Falling of a Sparrow*; And much more is like to reach to the *Preseruation* of *Birds* in such *Seasons*. The *Naturall Cause* also may be the *Want* of *Heat*, and *Abundance* of *Moisture*, in the *Summer* precedent; Which putteth forth those *Fruits*, and must needs leaue great *Quantitie* of *Cold Vapours*,

pours, not dissipate; Which causeth the *Cold* of the *Winter* following.

Experiment Solitary touching *Medicines* that *Condense*, and *Relaxe* the *Spirits*. 738

THey haue in *Turkey*, a *Drinke* called *Coffa*, made of a *Berry* of the same Name, as *Blacke* as *Soot*, and of a *Strong Sent*, but not *Aromaticall*; Which they take, beaten into Powder, in *Water*, as Hot as they can drinke it: And they take it, and sit at it, in their *Coffa-Houses*, which are like our *Tauernes*. This *Drinke* comforteth the *Braine*, and *Heart*, and helpeth *Digestion*. Certainly this *Berry Coffa*; The *Root*, and *Leafe Betel*; The *Leafe Tobacco*; And the *Teare* of *Poppy*, (*Opium*) of which the *Turkes* are great Takers, (supposing it expelleth all Feare;) doe all Condense the *Spirits*, and make them Strong, and Aleger. But it seemeth they are taken after seuerall manners, For *Coffa* and *Opium* are taken downe; *Tobacco* but in *Smoake*; And *Betel* is but champed in the *Mouth*, with a little *Lime*. It is like there are more of them, if they were well found out, and well corrected. *Quære* of *Henbane-Seed*; Of *Mandrake*; Of *Saffron*, Root, and Flower; Of *Folium Indum*; Of *Amber-grice*; Of the *Assyrian Amomum*, if it may be had; And of the *Scarlet Powder*, which they call *Kermez*; And (generally) of all such Things, as doe inebriate, and prouoke *Sleepe*. Note that *Tobacco* is not taken in *Root*, or *Seed*, which are more forcible euer than *Leaues*.

Experiment Solitary touching *Paintings* of the *Body*. 739

THe *Turkes* haue a *Blacke Powder*, made of a *Minerall* called *Alcohole*; Which with a fine long Pencill they lay vnder their *Eye-lids*; Which doth colour them Blacke; Whereby the *White* of the *Eye* is set off more *White*. With the same *Powder* they colour also the *Haires* of their *Eye-lids*, and of their *Eye-browes*, which they draw into Embowed *Arches*. You shall finde that *Xenophon* maketh Mention, that the *Medes* vsed to paint their *Eyes*. The *Turkes* vse with the same *Tincture*, to colour the *Haire* of their *Heads* and *Beards* Blacke: And diuers with vs, that are growne *Gray*, and yet would appeare *Young*, finde meanes to make their *Haire* Blacke, by Combing it, (as they say,) with a Leaden Combe, or the like. As for the *Chineses*, who are of an ill Complexion, (being Oliuaster,) they paint their *Cheekes* Scarlet; Especially their *King*, and *Grandes*. Generally, *Barbarous People*, that goe Naked, doe not only paint Themselues, but they pownce and raze their Skinne, that the *Painting* may not be taken forth. And make into Workes. So doe the *West Indians*; And so did the Ancient *Picts*, and *Brittons*; So that it seemeth, *Men* would haue the *Colours* of *Birds Feathers*, if they could tell how; Or at least, they will haue *Gay Skins*, in stead of *Gay Cloathes*.

Experiment Solitary touching the *Vse* of *Bathing* and *Anointing*. 740

IT is strange, that the *Vse* of *Bathing*, as a Part of *Diet*, is left. With the *Romans*, and *Grecians*, it was as vsuall, as *Eating*, or *Sleeping*: And so is it amongst the *Turkes* at this day: Whereas with vs it remaineth but as a *Part* of *Physicke*. I am of Opinion, that the Vse of it, as it was with the *Romans*, was hurtfull to Health; For that it made the Body Soft, and easie to Waste. For the *Turkes* it is more proper, because that their *Drinking*

king Water, and *Feeding* vpon *Rize*, and other Food of small nourishment, maketh their *Bodies* so Solide, and Hard, as you need not feare that *Bathing* should make them *Frouthie*. Besides, the *Turkes* are great *Sitters*, and seldome walke; Whereby they Sweat lesse, and need *Bathing* more. But yet certaine it is, that *Bathing*, and especially *Annointing*, may be so vsed, as it may be a great Helpe to *Health*, and *Prolongation* of *Life*. But hereof we shall speake in due Place, when we come to handle *Experiments Medicinall*.

Experiment Solitary touching *Chamoletting* of *Paper*. 741

THe *Turkes* haue a Pretty Art of *Chamoletting* of *Paper*, which is not with vs in vse. They take diuers *Oyled Colours*, and put them seuerally (in drops) vpon *water*; And stirre the *Water* lightly; And then wet their *Paper*, (being of some Thicknesse,) with it; And the *Paper* will be Waued, and Veined, like *Chamolet*, or *Marble*.

Experiment Solitary touching *Cuttle-Inke*. 742

IT is somewhat strange, that the *Bloud* of all *Birds*, and *Beasts*, and *Fishes*, should be of a *Red Colour*, and only the *Bloud* of the *Cuttle* should be as *Blacke* as *Inke*. A Man would thinke, that the *Cause* should be the *High Concoction* of that *Bloud*; For we see in ordinary *Puddings*, that the *Boyling* turneth the *Bloud* to be *Blacke*; And the *Cuttle* is accounted a delicate *Meat*, and is much in Request.

Experiment Solitary touching *Encrease* of *weight* in *Earth*. 743

IT is reported of Credit, that if you take *Earth* from Land adioyning to the *Riuer* of *Nile*; And preserue it in that manner, that it neither come to be Wet, nor Wasted; And Weigh it daily, it will not alter *Weight* vntill the seuenteenth of *Iune*, which is the Day when the *Riuer* beginneth to rise; And then it will grow more and more *Ponderous*, till the *Riuer* commeth to his Heighth. Which if it bee true, it cannot bee caused, but by the *Aire*, which then beginneth to Condense; And so turneth within that small *Mould* into a degree of *Moisture*; Which produceth *Weight*. So it hath been obserued, that *Tobacco*, Cut, and Weighed, and then Dried by the Fire, loseth Weight; And after being laid in the open *Aire*, recouereth *Weight* againe. And it should seeme, that as soone as euer the *Riuer* beginneth to increase, the whole *Body* of the *Aire* thereabouts suffereth a Change: For (that which is more strange,) it is credibly affirmed, that vpon that very Day, when the *Riuer* first riseth, great *Plagues* in *Cairo*, vse suddenly to breake vp.

Experiments in Consort touching *Sleepe*. 744

THose that are very *Cold*, and especially in their *Feet*, cannot get to *Sleepe*. The *Cause* may be, for that in *Sleepe* is required a *Free Respiration*, which *Cold* doth shut in, and hinder: For wee see, that in great *Colds*, one can scarce draw his *Breath*. Another *Cause* may be, for that *Cold* calleth the *Spirits* to succour; And therefore they cannot so well close, and goe together in the *Head*; Which is euer requisite to *Sleepe*. And for the same *Cause*, *Pain*, and *Noise* hinder *Sleepe*; And *Darkenesse* (contrariwise) further *Sleepe*.

Some

Some *Noiſes* (whereof we ſpake in the 112. *Experiment*) helpe *Sleepe*; As the *Blowing* of the *Wind*, the *Trickling* of *Water*, *Humming* of *Bees*, *Soft Singing*, *Reading*, &c. The *Cauſe* is, for that they moue in the *Spirits* a gentle *Attention*; And whatſoeuer moueth *Attention*, without too much Labour, ſtilleth the Naturall and diſcurſiue *Motion* of the *Spirits*. 745

Sleepe nouriſheth, or at leaſt preſerueth *Bodies*, a long time, without other *Nouriſhment*. *Beaſts* that ſleepe in *Winter*, (as it is noted of *wilde Beares*,) during their *Sleep*, wax very Fat, though they Eat nothing. *Bats* haue beene found in Ouens, and other Hollow Cloſe Places, Matted one vpon another; And therefore it is likely that they *Sleepe* in the *Winter time*, and eat Nothing. *Quære*, whether *Bees* doe not *Sleep* all Winter, and ſpare their *Honey*? *Butterflies*, and other *Flies*, doe not onely *Sleepe*, but lie as *Dead* all *Winter*; And yet with a little *Heat* of *Sunne*, or *Fire*, reuiue againe. A *Dormouſe*, both *Winter* and *Summer*, will *Sleepe* ſome dayes together, and eat *Nothing*. 746

To reſtore *Teeth* in *Age*, were *Magnalæ Naturæ*. It may bee thought of. But howſoeuer the *Nature* of the *Teeth* deſerueth to be enquired of, as well as the other *Parts* of *Liuing Creatures Bodies*. Experiments in Conſort touching *Teeth* and *Hard Subſtances* in the *Bodies* of *Liuing Creatures*. 747

There be Fiue *Parts* in the *Bodies* of *Liuing Creatures*, that are of *Hard Subſtance*; The *Skull*; The *Teeth*, The *Bones*; The *Hornes*; and the *Nailes*. The greateſt *Quantity* of *Hard Subſtance* Continued, is towards the *Head*. For there is the *Skull* of one Entire *Bone*; There are the *Teeth*; There are the *Maxillarie Bones*; There is the *Hard Bone*, that is the *Inſtrument* of *Hearing*; And thence iſſue the *Hornes*: So that the *Building* of *Liuing Creatures Bodies*, is like the *Building* of a *Timber-Houſe*, where the *walls* and other *Parts* haue *Columnes* and *Beames*; But the *Roofe* is, in the better Sort of *Houſes*, all *Tile*, or *Lead*, or *Stone*. As for *Birds*, they haue Three other *Hard Subſtances* proper to them; The *Bill*, which is of like Matter with the *Teeth*; For no *Birds* haue *Teeth*: The *Shell* of the *Egge*: And their *Quils*: For as for their *Spurre*, it is but a *Naile*. But no *Liuing Creatures*, that haue *Shels* very hard; (As *Oyſters*, *Cockles*, *Muſſles*, *Scallops*, *Crabs*, *Lobſters*, *Cra-Fiſh*, *Shrimps*, and eſpecially the *Tortoiſe*,) haue *Bones* within them, but onely little *Griſtles*.

Bones, after full Growth, continue at a Stay: And ſo doth the *Skull*: *Hornes*, in ſome *Creatures*, are caſt and renued: *Teeth* ſtand at a Stay, except their Wearing: As for *Nailes*, they grow continually: And *Bils* and *Beakes* will ouer-grow, and ſometimes be caſt; as in *Eagles*, and *Parrots*.

Moſt of the *Hard Subſtances* flie to the *Extremes* of the *Body*; As *skull*, *Hornes*, *Teeth*, *Nailes*, and *Beakes*: Only the *Bones* are more *Inward*, and clad with *Fleſh*. As for the *Entrailes*, they are all without *Bones*; Saue that a *Bone* is (ſometimes) found in the *Heart* of a *Stag*; And it may be in ſome other *Creature*. 749

750 The *Skull* hath *Braines*, as a kinde of *Marrow*, within it. The *Backe-Bone* hath one Kinde of *Marrow*, which hath an Affinitie with the *Braine*; And other *Bones* of the *Body* haue another. The *Iaw-Bones* haue no *Marrow* Seuered, but a little *Pulpe* of *Marrow* diffuſed. *Teeth* likewiſe are thought to haue a kinde of *Marrow* diffuſed, which cauſeth the *Senſe* and *Paine*: But it is rather *Sinnew*; For *Marrow* hath no *Senſe*; No more than *Bloud*. *Horne* is alike thorowout; And ſo is the *Naile*.

751 None other of the *Hard Subſtances* haue *Senſe*, but the *Teeth*: And the *Teeth* haue *Senſe*, not onely of *Paine*, but of *Cold*.

But we will leaue the Enquiries *of other* Hard Subſtances, *vnto their ſeuerall Places*; *And now enquire only of the* Teeth.

752 The *Teeth* are, in *Men*, of three Kindes: *Sharpe*, as the *Fore-Teeth*; *Broad*, as the *Back-Teeth*, which we call the *Molar-Teeth*, or *Grinders*; And *Pointed Teeth*, or *Canine*, which are betweene both. But there haue been ſome *Men*, that haue had their *Teeth vndiuided*, as of one whole *Bone*, with ſome little Marke in the Place of the Diuiſion; as *Pyrrhus* had. Some *Creatures* haue *Ouer-long*, or *Out-growing Teeth*, which we call *Fangs*, or *Tuskes*; As *Boares*, *Pikes*, *Salmons*, and *Dogs*, though leſſe. Some *Liuing Creatures* haue *Teeth* againſt *Teeth*; As *Men*, and *Horſes*; And ſome haue *Teeth*, eſpecially their *Maſter-Teeth*, indented one within Another, like *Sawes*; As *Lions*; And ſo againe haue *Dogs*. Some *Fiſhes* haue diuers *Rowes* of *Teeth*, in the *Roofes* of their *Mouthes*; As *Pikes*, *Salmons*, *Trouts*, &c. And many more in *Salt-Waters*. *Snakes* and other *Serpents*, haue *Venemous Teeth*; which are ſometimes miſtaken for their *Sting*.

753 No *Beaſt* that hath *Hornes*, hath *Vpper Teeth*; And no *Beaſt*, that hath *Teeth* aboue, wanteth them below: But yet if they be of the ſame kinde, it followeth not, that if the *Hard Matter* goeth not into *Vpper Teeth*, it will goe into *Hornes*; Nor yet *è conuerſo*; For *Doe's*, that haue no *Hornes*, haue no *Vpper Teeth*.

754 *Horſes* haue, at three yeares old, a *Tooth* put forth, which they call the *Cobs Tooth*; And at foure yeeres old there commeth the *Mark-Tooth*, which hath a *Hole*, as big as you may lay a *Peaſe* within it; And that weareth ſhorter and ſhorter, euery yeare; Till that at eight yeares old, the *Tooth* is ſmooth, aud the *Hole* gone; And then they ſay; *That the Marke is out of the Horſes Mouth*.

755 The *Teeth* of *Men* breed firſt, when the *Childe* is about a yeere and halfe old: And then they caſt them, and new come about ſeuen yeares old. But diuers haue *Back-ward Teeth* come forth at Twentie, yea ſome at Thirty, and Forty. *Quære* of the manner of the *Commiug* of them forth. They tell a Tale of the old *Counteſſe* of *Deſmond*, who liued till ſhe was ſeuen-ſcore yeeres old, that ſhe did *Dentire*, twice, or thrice; Caſting her old *Teeth*, and others comming in their Place.

756 *Teeth* are much hurt by *Sweet-Meats*; And by *Painting* with *Mercury*; And by *Things Ouer-hot*; And by *Things Ouer-cold*; And by *Rheumes*. And the *Paine* of the *Teeth*, is one of the ſharpeſt of *Paines*.

Concerning

757

Concerning *Teeth*, these Things are to bee Considered. 1. The *Preserving* of them. 2. The *Keeping* of them *White*. 3. The *Drawing* of them with *Leaft Paine*. 4. The *Staying* and *Easing* of the *Tooth-Ach*. 5. The *Binding* in of *Artificiall Teeth*, where *Teeth* haue beene ſtrucken out. 6. And laſt of all, that Great One, of *Reſtoring Teeth* in *Age*. The *Inſtances* that giue any likelihood of *Reſtoring Teeth* in *Age*, are; The *Late Comming* of *Teeth* in ſome; And the *Renewing* of the *Beakes* in *Birds*, which are Commateriall with *Teeth*. *Quare* therefore more particularly how that commeth. And againe, the *Renewing* of *Hornes*. But yet that hath not beene knowne to haue beene prouoked by *Art*; Therefore let *Triall* bee made, whether *Hornes* may bee procured to grow in *Beaſts* that are not *Horned*, and how? And whether they may bee procured to come *Larger* than vſuall; As to make an *Oxe*, or a *Deere*, haue a *Greater Head* of *Hornes*? And whether the *Head* of a *Deere*, that by *Age* is more *Spitted*, may be brought againe to be more *Branched*; For theſe *Trialls*, and the like, will ſhew, whether by *Art* ſuch *Hard Matter* can be called, and prouoked. It may be tried alſo, whether *Birds* may not haue ſome thing done to them, when they are *Young*, whereby they may be made to haue *Greater*, or *Longer Bils*; Or *Greater* and *Longer Tallons*? And whether *Children* may not haue ſome *waſh*, or Something to make their *Teeth Better*, and *Stronger*? *Corall* is in vſe as an Helpe to the *Teeth* of *Children*.

Experiments in Conſort, touching the *Generation* and *Bearing* of *Liuing Creatures* in the *Wombe*.

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SOme *Liuing Creatures generate* but at certaine *Seaſons* of the *Yeare*; As *Deere*, *Sheepe*, *Wilde Conneyes*, &c. And moſt Sorts of *Birds*, and *Fiſhes*: Others at *any time* of the *Yeare*, as *Men*; And all *Domeſticke Creatures*; As *Horſes*, *Hogges*, *Dogges*, *Cats*, &c. The *Cauſe* of *Generation* at *all Seaſons* ſeemeth to bee *Fulneſſe*: For *Generation* is from *Redundance*. This *Fulneſſe* ariſeth from two *Cauſes*; Either from the *Nature* of the *Creature*, if it be *Hot*, and *Moiſt*, and *Sanguine*; Or from *Plenty* of *Food*. For the firſt, *Men*, *Horſes*, *Dogs*, &c. which breed at all Seaſons, are full of *Heat* and *Moiſture*; *Doues* are the fulleſt of *Heat* and *Moiſture* amongſt *Birds*, and therefore breed often; The *Tame Doue* almoſt continually. But *Deere* are a *Melancholy Dry Creature*, as appeareth by their *Fearefulneſſe*, and the *Hardneſſe* of their *Fleſh*. *Sheepe* are a *Cold Creature*, as appeareth by their *Mildneſſe*, and for that they ſeldome *Drinke*. Moſt ſort of *Birds* are of a dry *Subſtance* in compariſon of *Beaſts*. *Fiſhes* are cold. For the ſecond *Cauſe*, *Fulneſſe* of *Food*; *Men*, *Kine*, *Swine*, *Dogs*, &c. feed full; And we ſee that thoſe *Creatures*, which being *Wilde*, generate ſeldome, being *Tame*, generate often; Which is from *Warmth*, and *Fulneſſe* of *Food*. We finde, that the Time of *Going* to *Rut* of *Deere*, is in *September*; For that they need the whole *Summers Feed* and *Graſſe*, to make them fit for *Generation*. And if *Raine* come Early about the Middle of *September*, they goe to Rut ſomewhat the ſooner; If *Drought*, ſomewhat the later. So *Sheepe*, in reſpect of their ſmall *Heat*, generate about the ſame time, or ſomewhat before. But for the moſt part, *Creatures* that generate at cer-

taine *Seasons*, generate in the *Spring*; As *Birds*, and *Fishes*; For that the *End* of the *Winter*, and the *Heat*, and *Comfort* of the *Spring* prepareth them. There is also another *Reason*, why some *Creatures* generate at certaine *Seasons*: And that is the *Relation* of their *Time* of *Bearing*, to the time of Generation: For no *Creature* goeth to generate, whilest the *Female* is full; Nor whilest she is busie in *Sitting* or *Rearing* her *Young*. And therefore it is found by Experience, that if you take the *Egges*, or *Young Ones*, out of the *Neasts* of *Birds*, they will fall to generate againe, three or foure times, one after another.

759 Of *Living Creatures*, some are *Longer time* in the *Wombe*, and some *Shorter*. *Women* goe commonly nine *Moneths*; The *Cow* and the *Ewe* about six Moneths; *Do's* goe about nine Moneths; *Mares* eleuen Moneths; *Bitches* nine Weekes; *Elephants* are said to goe two Yeares; For the Receiued *Tradition* of ten Yearers is *Fabulous*. For *Birds* there is double Enquiry; The *Distance* betweene the *Treading* or *Coupling*, and the *Laying* of the *Egge*; And againe betweene the *Egge Layed*, and the *Discloſing* or *Hatching*. And amongst *Birds*, there is lesse *Diuersity* of *Time*, than amongst other *Creatures*; yet some there is: for the *Hen* sitteth but three Weekes; The *Turkey-Hen*, *Gooſe*, and *Ducke*, a Moneth. *Quare* of others. The *Cause* of the great *Difference* of *Times*, amongst *Liuing Creatures*, is, Either from the *Nature* of the *Kinde*; Or from the *Constitution* of the *Wombe*. For the former, those that are longer in *Comming* to their *Maturity* or *Growth*, are longer in the *Wombe*; As is chiefly seene in *Men*; And so *Elephants* which are long in the *Wombe*, are long time in *Comming* to their full *Growth*. But in most other Kindes, the *Constitution* of the *Wombe*, (that is, the *Hardnesse* or *Drineſſe* thereof,) is concurrent with the former *Cause*. For the *Colt* hath about foure yeares of *Growth*; And so the *Fawne*; And so the *Calfe*. But *Whelps*, which come to their *Growth* (commonly) within three Quarters of a yeare, are but nine Weekes in the *Wombe*. As for *Birds*, as there is lesse Diuersity amongst them, in the time of their *Bringing forth*; So there is lesse Diuersity in the time of their *Growth*; Most of them comming to their *Growth* within a Twelue-Moneth.

760 Some *Creatures* bring forth many *Young Ones* at a *Burthen*; As *Bitches*, *Hares*, *Conneyes*, &c. Some (ordinarily) but *One*; As *Women*, *Lioneſſes*, &c. This may be caused either by the *Quantity* of *Sperme* required to the *Producing* One of that Kinde; which if lesse bee required, may admit greater Number; If more, fewer: Or by the *Partitions* and *Cells* of the *Wombe*, which may seuer the *Sperme*.

Experiments in Consort touching *Species Visible*.

761 THere is no doubt, but *Light* by *Refraction* will shew greater, as well as *Things Coloured*. For like as a *Shilling* in the *Bottome* of the *Water*, will shew greater; So will a *Candle* in a *Lanthorne*, in the *Bottome* of the *Water*. I haue heard of a Practise, that *Glo-wormes* in *Glasses* were put in the *Water*, to make the *Fish* come. But I am not yet informed, whether when a *Diuer* Diueth, hauing his *Eyes* open, and swimmeth vpon his *Backe*,

Backe; whether (I say) he seeth things in the *Aire* greater, or lesse. For it is manifest, that when the *Eye* standeth in the *Finer Medium*, and the *Obiect* is in the *Grosser*, things shew greater; But contrariwise, when the *Eye* is placed in the *Grosser Medium*, and the *Obiect* in the *Finer*, how it worketh I know not.

It would be well boulted out, whether great *Refractions* may not bee made vpon *Reflections*, as well as vpon *Direct Beames*. For Example, We see that take an *Empty Basen*, put an *Angell* of *Gold*, or what you will, into it; Then goe so farre from the *Basen*, till you cannot see the *Angell*, because it is not in a *Right Line*; Then fill the *Basen* with *Water*, and you shall see it out of his Place, because of the *Reflection*. To proceed therefore; put a *Looking-Glasse*, into a *Basen* of *Water*; I suppose you shall not see the *Image* in a *Right Line*, or at equall *Angles*, but aside. I know not, whether this *Experiment* may not be extended so, as you might see the *Image*, and not the *Glasse*; Which for *Beauty* and *Strangenesse*, were a fine Proofe: For then you should see the *Image* like a *Spirit* in the *Aire*: As for Example, If there be a *Cesterne* or *Poole* of *water*, you shall place ouer against it a *Picture* of the *Deuill*, or what you will, so as you doe not see the *water*. Then put a *Looking-Glasse* in the *Water*: Now if you can see the *Deuils Picture* aside, not seeing the *water*, it will looke like a *Deuill* indeed. They haue an old Tale in *Oxford*, that *Friar Bacon* walked betweene two *Steeples*: Which was thought to be done by *Glasses*, when he walked vpon the *Ground*. 762

A *Weighty Body* put into *Motion*, is more easily impelled, than at first when it *Resteth*. The *Cause* is, partly because *Motion* doth discusse the *Torpour* of *Solid Bodies*; Which beside their *Motion* of *Grauity*, haue in them a *Naturall Appetite*, not to moue at all; And partly, because a *Body* that resteth, doth get, by the *Resistance* of the *Body* vpon which it resteth, a stronger *Compression* of *Parts*, than it hath of it Selfe: And therefore needeth more Force to be put in *Motion*. For if a *Weighty Body* be Pensile, and hang but by a *Thred*, the *Percussion* will make an *Impulsion* very neere as easily, as if it were already in *Motion*. Experiments in Consort, touching *Impulsion* and *Percussion*. 763

A *Body Ouer-great*, or *Ouer small*, will not bee throwne so farre as a *Body* of a *Middle Size*: So that (it seemeth) there must bee a *Commensuration*, or *Proportion*, betweene the *Body Moued*, and the *Force*, to make it moue well. The *Cause* is, because to the *Impulsion*, there is requisite the *Force* of the *Body* that *Moueth*, and the *Resistance* of the *Body* that is *Moued*: And if the *Body* be *too great*, it yeeldeth too little; And if it be *too small*, it resisteth too little. 764

It is *Common Experience*, that no *weight* will presse or cut so strong, being laid vpon a *Body*, as Falling, or strucken from aboue. It may be the *Aire* hath some part in furthering the *Percussion*: But the chiefe *Cause* I take to be, for that the *Parts* of the *Body Moued*, haue by *Impulsion*, or by the *Motion* of *Grauity continued*, a *Compression* in them, as well downwards, as they haue when they are throwne, or Shot thorow the *Aire*, forwards; 765

forwards. I conceiue alſo, that the quicke *Looſe* of that *Motion*, preuenteth the *Reſiſtance* of the *Body* below; And *Priority* of the *Force* (alwaies) is of great *Efficacy*; As appeareth in infinite *Inſtances*.

Experiment Solitary touching *Titillation*. 766

Tickling is moſt in the *Soles* of the *Feet*, and vnder the *Arme-Holes*, and on the *Sides*. The *Cauſe* is, the *Thinneſſe* of the *Skinne* in thoſe *Parts*; Ioyned with the Rareneſſe of being touched there. For all *Tickling* is a light *Motion* of the *Spirits*, which the *Thinneſſe* of the *Skin*, and *Suddenneſſe*, and *Rareneſſe* of *Touch*, doe further: For we ſee, a *Feather*, or a *Ruſh* drawne along the *Lip*, or *Cheeke*, doth tickle; Whereas a *Thing* more *Obtuſe*, or a *Touch* more *Hard*, doth not. And for *Suddenneſſe*; We ſee no *Man* can tickle himſelfe: We ſee alſo, that the *Pâlme* of the *Hand*, though it hath as *Thin* a *Skin*, as the other *Parts* Mentioned, yet is not Tickliſh, becauſe it is accuſtomed to be Touched. *Tickling* alſo cauſeth *Laughter*. The *Cauſe* may be, the *Emiſſion* of the *Spirits*, and ſo of the *Breath*, by a Flight from *Titillation*; For vpon *Tickling*, we ſee there is euer a *Starting*, or *Shrinking* away of the Part, to auoid it; And we ſee alſo, that if you Tickle the *Noſthrills*, with a *Feather*, or *Straw*, it procureth *Sneezing*; Which is a *Sudden Emiſſion* of the *Spirits*, that doe likewiſe expell the *Moiſture*. And *Tickling* is euer Painfull, and not well endured.

Experiment Solitary touching the *Scarcity* of *Raine* in *Ægypt*. 767

IT is ſtrange, that the *Riuer* of *Nilus*, Ouer-flowing as it doth, the *Country* of *Ægypt*, there ſhould be neuertheleſſe little or no *Raine* in that *Country*. The *Cauſe* muſt be, Either in the *Nature* of the *Water*; Or in the *Nature* of the *Aire*; Or of Both. In the *Water*, it may be aſcribed, either vnto the *Long Race* of the *Water*; For *Swift Running Waters* vapour not ſo much as *Standing Waters*; Or elſe to the *Concoction* of the *Water*; For *Waters* well *Concocted* vapour not ſo much as *Waters Raw*; No more than *Waters* vpon the Fire doe vapour ſo much, after ſome time of Boyling, as at the firſt. And it is true, that the *Water* of *Nilus* is ſweeter than other *Waters* in Taſte; And it is excellent Good for the *Stone*, and *Hypochondriacall Melancholy*; Which ſheweth it is *Lenefying*: And it runneth thorow a *Countrey* of a *Hot Climate*, and flat, without Shade, either of *Woods*, or *Hills*; Whereby the *Sunne* muſt needs haue great Power to *Concoct* it. As for the *Aire*, (from whence I conceiue this Want of Showers commeth chiefly;) The *Cauſe* muſt be, for that the *Aire* is, of it ſelfe, *Thin* and *Thirſty*; And as ſoone as euer it getteth any *Moiſture* from the *Water*, it imbibeth, and diſſipateth it, in the whole body of the *Aire*; And ſuffereth it not to remaine in *Vapour*; Whereby it might breed *Raine*.

Experiment Solitary touching *Clarification*. 768

IT hath beene touched in the *Title* of *Percolations*, (Namely ſuch as are *Inwards*,) that the *Whites* of *Egs*, and *Milke*, doe clarifie; And it is certaine, that in *Ægypt*, they prepare and clarifie the *Water* of *Nile*, by putting it into great *Iarres* of *Stone*, and Stirring it about with a few Stamped

Stamped *Almonds*; Wherewith they also besmeare the Mouth of the *Vessell*; And so draw it off, after it hath rested some time. It were good, to trie this *Clarifying* with *Almonds*, in *New Beere*, or *Must*, to hasten, and perfect the *Clarifying*.

Experiment Solitary touching *Plants* without *Leaues*. 769

THere be scarce to be found any *Vegetables*, that haue *Branches*, and no *Leaues*; except you allow *Corall* for one. But there is also in the *Desarts* of *S. Macario* in *Ægypt*, a *Plant* which is Long, Leaueleſſe, Browne of Colour, and Branched like *Corall*, saue that it closeth at the *Top*. This being set in *Water* within *House*, spreadeth and displayeth strangely; And the people thereabouts haue a Superstitious Beleefe, that in the *Labour* of *women*, it helpeth to the *Easie Deliuerance*.

Experiment Solitary touching the *Materialls* of *Glasse*. 770

THe *Crystalline Venice Glasse*, is reported to be a Mixture, in equall Portions, of *Stones*, brought from *Pauia* by the *Riuer Ticinum*; And the *Ashes* of a *Weed* called by the *Arabs Kall*, which is gathered in a *Desart* betweene *Alexandria* and *Rosetta*; And is by the *Ægyptians* vsed first for Fuell; And then they crush the *Ashes* into Lumps, like a *Stone*; And so sell them to the *Venetians* for their *Glasse-workes*.

Experiment Solitary touching *Prohibition* of *Putrefaction*, and the *Long Conseruation* of *Bodies*. 771

IT is strange, and well to be noted, how long *Carkasses* haue continued *Incorrupt*, and in the former *Dimensions*; As appeareth in the *Mummies* of *Ægypt*; Hauing lasted, as is conceiued, (some of them;) three thousand yeeres. It is true, they finde Meanes to draw forth the *Braines*, and to take forth the *Entrailes*, which are the *Parts* apte ſt to corrupt. But that is nothing to the Wonder; For wee see, what a Soft and Corruptible *Substance* the *Flesh*, of all the other *Parts* of the *Body*, is. But it should seeme, that according to our *Obseruation*, and *Axiome*, in our hundredth *Experiment*, *Putrefaction*, which we conceiue to be so *Naturall* a *Period* of *Bodies*, is but an *Accident*; And that *Matter* maketh not that Haste to *Corruption*, that is conceiued. And therefore *Bodies* in *Shining-Amber*; In *Quick-Siluer*; In *Balmes*, (whereof we now speake;) In *Wax*; In *Honey*; In *Gummes*; And (it may be) in *Conseruatories* of *Snow*; &c. are preserued very long. It need not goe for Repetition, if we resume againe that which we said in the aforesaid *Experiment*, concerning *Annihilation*; Namely, that if you prouide against three *Causes* of *Putrefaction*, *Bodies* will not corrupt: The first is, that the *Aire* be *excluded*; For that vndermineth the *Body*, and conspireth with the *Spirit* of the *Body* to dissolue it. The Second is, that the *Body Adiacent* and *Ambient* be not Commateriall, but meerely Heterogeneall towards the Body that is to bee preserued. For if Nothing can be receiued by the One, Nothing can issue from the Other; Such are *Quicke-Siluer*, and *white-Amber*, to *Herbs*, and *Flies*, and such *Bodies*. The Third is, that the *Body* to be preserued, be not of that *Grosse*, that it may corrupt within it selfe, although no Part of it issue into the *Body Adiacent*: And therefore it must be rather *Thin* and *Small*, than of *Bulke*. There is a Fourth *Remedie* also, which is;

That

That if the *Body* to be preſerued be of *Bulke*, as a *Corps* is, then the *Body* that Incloſeth it, muſt haue a Vertue to draw forth, and drie the *Moiſture* of the *Inward Body*; For elſe the *Putrifaction* will play within, though nothing iſſue forth. I remember *Liuy* doth relate, that there were found, at a time, two *Coffins* of *Lead*, in a *Tombe*; whereof the one contained the *Body* of *King Numa*; it being ſome foure hundred yeares after his Death: And the other, his *Bookes* of *Sacred Rites* and *Ceremonies*, and the *Diſcipline* of the *Pontifes*; And that in the *Coffin* that had the *Bodie*, there was Nothing (at all) to be ſeen, but a little light *Cinders* about the *Sides*; But in the *Coffin* that had the *Bookes*, they were found as freſh, as if they had beene but newly Written; being written in *Parchment*, and couered ouer with *Watch-Candles* of *Wax*, three or foure fold. By this it ſeemeth, that the *Romans*, in *Numa's* time, were not ſo good *Embalmers*, as the *Ægyptians* were; Which was the *Cauſe* that the Body was vtterly conſumed. But I find in *Plutarch*, and Others, that when *Auguſtus Cæſar* viſited the *Sepulchre* of *Alexander* the *Great*, in *Alexandria*, he found the *Body* to keepe his *Dimenſion*; But withall, that, notwithſtanding all the *Embalming*, (which no doubt was of the beſt,) the *Body* was ſo Tender, as *Cæſar* touching but the *Noſe* of it, defaced it. Which maketh mee finde it very ſtrange, that the *Ægyptian Mummies* ſhould be reported to be as Hard as *Stone-Pitch*: For I finde no difference but one; Which indeed may be very Materiall; Namely, that the Ancient *Ægyptian Mummies*, were ſhrowded in a Number of Folds of *Linnen*, beſmeared with *Gummes*, in manner of *Seare-Cloth*; Which it doth not appeare was practiſed vpon the *Body* of *Alexander*.

Experiment Solitary touching the *Abundance* of *Nitre* in certaine *Sea-Shoares*.
772

NEare the *Caſtle* of *Catie*, and by the *Wells* of *Aſſan*, in the *Land* of *Idumea*, a great Part of the Way, you would thinke the *Sea* were neare hand, though it be a good diſtance off: And it is Nothing, but the *Shining* of the *Nitre*, vpon the *Sea Sands*; Such *Abundance* of *Nitre* the Shores there doe put forth.

Experiment Solitary touching *Bodies* that are *borne vp* by *Water*.
773

THe *Dead-Sea*, which Vomiteth vp *Bitumen*, is of that *Craſſitude*, as *Liuing Bodies* bound Hand and Foot, caſt into it, haue been borne vp, and not ſunke. Which ſheweth, that all *Sinking* into *Water*, is but an *Ouer-Weight* of the *Body*, put into the *Water*, in reſpect of the *Water*: So that you may make *Water* ſo ſtrong, and heauy, of *Quick-Siluer*, (perhaps,) or the like, as may beare vp *Iron*: Of which I ſee no Vſe, but Impoſture. We ſee alſo, that all *Metalls*, except *Gold*, for the ſame reaſon, ſwimme vpon *Quick-ſiluer*.

Experiment Solitary touching *Fuell*, that *conſumeth little*, or *nothing*.
774

IT is reported, that at the *Foot* of a *Hill*, neare the *Mare mortuum*, there is a *Blacke Stone*, (whereof *Pilgrims* make Fires,) which burneth like a *Coale*, and diminiſheth not; But onely waxeth Brighter and Whiter. That it ſhould doe ſo, is not ſtrange; For we ſee *Iron* Red Hot burneth, and conſumeth not: But the ſtrangeneſſe is, that it ſhould continue any time

time so: For *Iron*, as soone as it is out of the Fire, deadeth straightwaies. Certainly, it were a Thing of great Vse, and Profit, if you could finde out *Fuell*, that would burne Hot, and yet last long: Neither am I altogether Incredulous, but there may be such *Candles*, as they say are made of *Salamander's Woole*: Being a Kinde of *Minerall*, which whiteneth also in the Burning, and consumeth not. The Question is this, *Flame* must be made of somewhat; And commonly it is made of some *Tangible Body*, which hath *weight*: But it is not impossible, perhaps, that it should be made of *Spirit* or *Vapour*, in a *Body*; (which *Spirit* or *Vapour* hath no *weight*;) such as is the Matter of *Ignis Fatuus*. But then you will say, that that *Vapour* also can last but a short time: To that it may be answered, That by the helpe of *Oile* and *Wax*, and other *Candle-Stuffe*, the *Flame* may continue, and the *Wieke* not burne.

Experiment Solitary *Oeconomicall* touching *Cheape Fuell*. 775

Sea-Coale last longer than *Char-Coale*; And *Char-Coale* of *Roots*, being Seoaled into great Peeces, last longer than Ordinary *Char-Coale*. *Turfe*, and *Peat*, and *Cow-Sheards*, are cheape *Fuels*, and last long. *Smal-Coale*, or *Briar-Coale*, powred vpon *Char-Goale*, make them last longer. *Sedge* is a cheape *Fuell* to Brew, or Bake with; the rather because it is good for Nothing else. Triall would be made of some Mixture of *Sea-Coale* with *Earth*, or *Chalke*; For if that *Mixture* be, as the *Sea-Coale-Men* vse it, priuily, to make the Bulke of the *Coale* greater, it is Deceit; But if it be vsed purposely, and be made knowne, it is Sauing.

Experiment Solitary touching the *Gathering* of *Wind* for *Freshnesse*. 776

It is, at this Day, in vse, in *Gaza*, to couch *Pot-Sheards* or *Vessels* of *Earth*, in their *walls*, to gather the *wind* from the Top, and to passe it downe in Spouts into *Roomes*. It is a Deuice for *Freshnesse*, in great Heats: And it is said, there are some *Roomes* in *Italy*, and *Spaine*, for *Freshnesse*, and *Gathering* the *Winds*, and *Aire*, in the *Heats* of *Summer*. But they be but *Pennings* of the *winds*, and *Enlarging* them againe, and *Making* them *Reuerberate*, and *goe round* in *Circles*, rather than this *Deuice* of *Spouts* in the *wall*.

Experiment Solitary touching the *Trialls* of *Aires*. 777

There would be vsed much diligence, in the Choise of some *Bodies*, and *Places*, (as it were) for the *Tasting* of *Aire*; to discouer the *Wholsomenesse* or *Vnwholesomenesse*, as well of *Seasons*, as of the *Seats* of *Dwellings*. It is certaine, that there be some *Houses*, wherein *Confitures*, and *Pies*, will gather *Mould*, more than in Others. And I am perswaded, that a *Peece* of *Raw Flesh*, or *Fish*, will sooner corrupt in some *Aires*, than in Others. They be noble *Experiments*, that can make this *Discouery*; For they serue for a *Naturall Diuination* of *Seasons*: Better than the *Astronomers* can by their *Figures*: And againe, they teach *Men* where to chuse their *Dwelling*, for their better *Health*.

Experiment Solitary touching *Increa-*

There is a Kind of *Stone*, about *Bethleem*, which they grinde to *Powder*, and put into *water*, whereof *Cattell* drinke; which maketh them

giue

ſing of *Milke* in *Milch-Beaſts.* 778

giue more *Milke*. Surely, there would be ſome better Trialls made of *Mixtures* of *Water* in *Ponds* for *Cattell*, to make them more *Milch*; Or to *Fatten* them; Or to *Keepe them* from *Murraine*. It may be, *Chalke*, and *Nitre*, are of the beſt.

Experiment Solitary touching *Sand* of the *Nature* of *Glaſſe*. 779

IT is reported, that in the *Valley*, neere the *Mountaine Carmel*, in *Iudea*, there is a *Sand*, which of all other, hath moſt affinity with *Glaſſe*; Inſomuch as other *Minerals*, laid in it, turne to a *Glaſſie Subſtance*, without the *Fire*; And againe *Glaſſe* put into it, turneth into the *Mother-Sand*. The thing is very ſtrange, if it be true: And it is likelieſt to be Cauſed by ſome *Naturall Fornace*, or *Heat* in the *Earth*: And yet they doe not ſpeak of any *Eruption* of *Flames*. It were good to try in *Glaſſe-Workes*, whether the *Crude Materials* of *Glaſſe*, mingled with *Glaſſe*, already made, and Re-moulten, doe not facilitate the *Making* of *Glaſſe* with leſſe *Heat*.

Experiment Solitary touching the *Growth* of *Corall*. 780

IN the *Sea*, vpon the *South-weſt* of *Sicily*, much *Corall* is found. It is a *Sub-Marine Plant*. It hath no *Leaues*: It brancheth only when it is vnder *Water*; It is *Soft*, and *Greene* of *Colour*; But being brought into the *Aire*, it becommeth *Hard*, and *Shining* Red, as wee ſee. It is ſaid alſo, to haue a *White Berry*; But we finde it not brought ouer with the *Corall*. Belike it is caſt away as nothing worth: Inquire better of it, for the *Diſcouery* of the *Nature* of the *Plant*.

Experiment Solitary touching the *Gathering* of *Manna*. 781

THe *Manna* of *Calabria* is the beſt, and in moſt Plenty. They gather it from the *Leafe* of the *Mulberry Tree*; But not of ſuch *Mulberrie Trees*, as grow in the *Valley's*. And *Manna* falleth vpon the *Leaues* by *Night*, as other *Dewes* do. It ſhould ſeeme, that before thoſe *Dewes* come vpon *Trees*, in the *Valley's*, they diſſipate, and cannot hold out. It ſhould ſeeme alſo, the *Mulberry-Leafe*, it ſelfe, hath ſome Coagulating Vertue, which inſpiſſateth the *Dew*, for that it is not found vpon other *Trees*: And wee ſee by the *Silke-Worme*, which feedeth vpon that *Leafe*, what a Dainty Smooth *Iuyce* it hath; And the *Leaues* alſo, (eſpecially of the Blacke *Mulberry*,) are ſomewhat Briſtly, which may helpe to preſerue the *Dew*. *Certainly*, it were nor amiſſe, to obſerue a little better, the *Dewes* that fall vpon *Trees*, or *Herbs*, Growing on *Mountaines*; For it may be, many *Dewes* fall, that ſpend before they come to the *Valleyes*. And I ſuppoſe, that he that would gather the beſt *May-Dew* for *Medicine*, ſhould gather it from the *Hils*.

Experiment Solitary touching the *Correcting* of *Wine*. 782

IT is ſaid, they haue a manner, to prepare their *Greek-Wines*, to keepe them from *Fuming*, and *Inebriating*, by adding ſome *Sulphur*, or *Allome*: Whereof the one is *Vnctuous*, and the other is *Aſtringent*. And certaine it is, that thoſe two *Natures* doe beſt repreſſe *Fumes*. This *Experiment* would be transferred, vnto other *Wine*, and *Strong Beere*, by Putting in ſome like *Subſtances*, while they worke; Which may make them both to *Fume* leſſe, and to *Inflame* leſſe.

It

Experiment Solitary touching the *Materials* of *Wilde-Fire*. 783

IT is conceiued by some, (not improbably,) that the reason, why *Wilde-Fires*, (whereof the principall Ingredient is *Bitumen*,) doe not quench with *Water*, is, for that the first *Concretion* of *Bitumen* is a *Mixture* of a *Fiery*, and *watry Substance*: So is not *Sulphur*. This appeareth, for that in the *Place* neare *Puteoli*, which they call the *Court* of *Vulcan*, you shall heare, vnder the *Earth*, a Horrible Thundring of *Fire*, and *Water*, conflicting together: And there breake forth also *Spouts* of *Boyling Water*. Now that *Place* yeeldeth great *Quantities* of *Bitumen*, Whereas *Ætna*, and *Vesuuius*, and the like, which consist vpon *Sulphur*, shoot forth *Smoake*, and *Ashes*, and *Pumice*, but no *Water*. It is reported also, that *Bitumen* Mingled with *Lime*, and Put vnder *Water*, will make, as it were, an *Artificiall Rocke*; The *Substance* becommeth so Hard.

Experiment Solitary touching *Plaster* growing as *Hard* as *Marble*. 784

THere is a *Cement* compounded of *Flowre*, *whites* of *Egges*, and *Stone powdred*, that becommeth Hard as *Marble*; wherewith *Piscina mirabilis*, neare *Cuma*, is said to haue the *Walls* Plaistered. And it is certaine, and tried, that the *Powder* of *Load-Stone*, and *Flint*, by the Addition of *whites* of *Egges*, and *Gum-Dragon*, made into *Paste*, will in a few dayes harden to the Hardnesse of a *Stone*.

Experiment Solitary touching *Iudgement* of the *Cure* in some *Vlcers* and *Hurts*. 785

IT hath beene noted by the *Ancients*, that in *Full* or *Impure Bodies*, *Vlcers* or Hurts in the *Legs*, are Hard to Cure; And in the *Head* more Easie. The *Cause* is, for that *Vlcers* or *Hurts* in the *Legs* require *Desiccation*, which by the *Defluxion* of *Humours* to the *Lower Parts* is hindred; Whereas *Hurts* and *Vlcers* in the *Head* require it not; But contrariwise *Drinesse* maketh them more apt to Consolidate. And in Moderne Obseruation, the like difference hath beene found, betweene *French-Men*, and *English-Men*; Whereof the ones *Constitution* is more *Drie*, and the others more *Moist*. And therefore a *Hurt* of the *Head* is harder to cure in a *French-Man*, and of the *Legge* in an *English-Man*.

Experiment Solitary touching the *Healthfulnesse* or *Vnhealthfulnesse* of the *Southerne Wind*. 786

IT hath beene noted by the *Ancients*, that *Southerne Winds*, blowing much, without *Raine*, doe cause a *Feuourous Disposition* of the *Yeare*; But with *Raine*, not. The *Cause* is, for that *Southerne Winds* doe, of themselues, qualifie the *Aire*, to be apt to cause *Feuers*; But when *Showers* are ioyned, they doe Refrigerate in Part, and Checke the Sultry *Heat* of the *Southerne Wind*. Therefore this holdeth not in the *Sea-Coasts*, because the *Vapour* of the *Sea*, without *Showers*, doth refresh.

Experiment Solitary touching *Wounds*. 787

IT hath beene noted by the *Ancients*, that *Wounds* which are made with *Brasse*, heale more easily, than *Wounds* made with *Iron*. The *Cause* is, for that *Brasse* hath, in it selfe, a *Sanatiue Vertue*; And so in the very Instant helpeth somewhat: But *Iron* is *Corrosiue*, and not *Sanatiue*. And therefore it were good, that the Instruments which are vsed by *Chirurgians* about wounds, were rather of *Brasse*, than *Iron*.

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Experiment Solitary touching *Mortification* by *Cold*. 788

IN the *Cold Countries*, when Mens *Noſes* and *Eares* are Mortified, and (as it were) Gangrened with *Cold*, if they come to a Fire, they rot off preſently. The *Cauſe* is, for that the few *Spirits*, that remaine in thoſe *Parts*, are ſuddenly drawne forth, and ſo *Putrifaction* is made Compleat. But *Snow* Put vpon them, helpeth; For that it preſerueth thoſe *Spirits* that remaine, till they can reuiue; And beſides, *Snow* hath in it a Secret *Warmth*: As the *Monke* proued out of the *Text*; *Qui dat Niuem ſicut Lanam, Gelu ſicut Cineres ſpargit*. Whereby he did inferre, that *Snow* did warme like *Wooll*, and *Froſt* did fret like *Aſhes*. *Warme Water* alſo doth good; Becauſe by little and little it openeth the Pores, without any ſudden Working vpon the *Spirits*. This *Experiment* may bee transferred vnto the *Cure* of *Gangrenes*, either Comming of themſelues, or induced by too much Applying of *Opiates*: Wherein you muſt beware of *Drie Heat*, and reſort to Things that are *Refrigerant*, with an Inward *Warmth*, and *Vertue* of Cheriſhing.

Experiment Solitary touching *Weight*. 789

WEigh *Iron*, and *Aqua Fortis*, ſeuerally; Then diſſolue the *Iron* in the *Aqua Fortis*: And weigh the *Diſſolution*; And you ſhall finde it to beare as good *Weight*, as the *Bodies* did ſeuerally: Notwithſtanding a good deale of Waſte, by a thicke *Vapour*, that iſſueth during the *working*: Which ſheweth that the opening of a *Body*, doth increaſe the *Weight*. This was tried once, or twice, but I know not, whether there were any *Errour*, in the *Triall*.

Experiment Solitary touching the *Super-Natation* of *Bodies*. 790

TAke of *Aqua-Fortis* two *Ounces*, of *Quick-ſiluer* two *Drachmes*; (For that Charge the *Aqua-Fortis* will beare;) The *Diſſolution* will not beare a *Flint*, as big as a *Nutmeg*: Yet (no doubt) the Increaſing of the *Weight* of *Water*, will increaſe his *Power* of *Bearing*; As wee ſee *Broine*, when it is Salt enough, will beare an *Egge*. And I remember well a *Phyſitian*, that vſed to giue ſome Minerall *Baths* for the *Gout*, &c. And the *Body* when it was put into the Bath, could not get downe ſo eaſily, as in Ordinary *Water*. But it ſeemeth, the *Weight* of the *Quick-ſiluer*, more than the *Weight* of a *Stone*; doth not compenſe the *Weight* of a *Stone*, more than the *Weight* of the *Aqua-Fortis*.

Experiment Solitary touching the *Flying* of *Vnequall Bodies* in the *Aire*. 791

LEt there be a Body of *Vnequall Weight*; (As of *Wood* and *Lead*, or *Bone* and *Lead*;) If you throw it from you with the *Light-End* forward, it will turne, and the *Weightier End* will recouer to be Forwards; Vnleſſe the *Body* be Ouer-long. The *Cauſe* is, for that the more *Denſe Body*, hath a more Violent *Preſſure* of the Parts, from the firſt *Impulſion*; Which is the *Cauſe*, (though heretofore not found out, as hath beene often ſaid,) of all *Violent Motions*: And when the *Hinder Part* moueth ſwifter, (for that it leſſe endureth *Preſſure* of *Parts*,) than the *Forward Part* can make way for it, it muſt needs be, that the *Body* turne ouer: For (turned) it can more eaſily draw forward the *Lighter* Part. *Galilæus* noteth it well; That if an *Open Trough*, wherein *Water* is, be driuen faſter than the *Water*

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can follow, the *Water* gathereth vpon an heape, towards the *Hinder End*, where the *Motion* began; Which he ſuppoſeth, (holding confidently the *Motion* of the *Earth*,) to be the *Cauſe* of the *Ebbing* and *Flowing* of the *Ocean*; Becauſe the *Earth* ouer-runneth the *Water*. Which *Theory*, though it be falſe, yet the firſt *Experiment* is true. As for the *Inequality* of the *Preſſure* of *Parts*, it appeareth manifeſtly in this; That if you take a *Body* of *Stone*, or *Iron*, and another of *Wood*, of the ſame *Magnitude*, and *Shape*, and throw them with equall Force, you cannot poſſibly throw the *Wood*, ſo farre, as the *Stone*, or *Iron*.

Experiment Solitary touching *Water*, that it may bee the *Medium* of *Sounds*. 792

IT is certaine, (as it hath beene formerly, in part, touched,) that *Water* may be the *Medium* of *Sounds*. If you daſh a *Stone* againſt a *Stone* in the *Bottome* of the *Water*, it maketh a *Sound*. So a long *Pole* ſtrucke vpon *Grauell*, in the *Bottome* of the *Water*, maketh a *Sound*. Nay, if you ſhould thinke that the *Sound* commeth vp by the *Pole*, and not by the *Water*, you ſhall finde that an *Anchor*, let downe by a *Roape*, maketh a *Sound*; And yet the *Roape* is no Solid *Body*, whereby the *Sound* can aſcend.

Experiment Solitary of the *Flight* of the *Spirits* vpon *Odious Obiects*. 793

ALL *Obiects* of the *Senſes*, which are very *Offenſiue*, do cauſe the *Spirits* to retire; And vpon their *Flight*, the *Parts* are (in ſome degree) deſtitute; And ſo there is induced in them a *Trepidation* and *Horrour*. For *Sounds*, we ſee that the *Grating* of a *Saw*, or any very *Harſh Noiſe*, will ſet the *Teeth* on edge, and make all the *Body* Shiuer. For *Taſtes*, we ſee that in the Taking of a *Potion*, or *Pils*, the *Head* and the *Necke* ſhake. For *Odious Smels*, the like Effect followeth, which is leſſe perceiued, becauſe there is a Remedy at hand, by Stopping of the *Noſe*: But in *Horſes*, that can vſe no ſuch Helpe, we ſee the *Smell* of a *Carrion*, eſpecially of a *Dead Horſe*, maketh them flie away, and take on, almoſt as if they were Mad. For *Feeling*, if you come out of the *Sunne*, ſuddenly, into a *Shade*, there followeth a *Chilneſſe*, or *Shiuering* in all the *Body*. And euen in *Sight*, which hath (in effect) no *Odious Obiect*, Comming into *Sudden Darkneſſe*, inducth an *Offer* to *Shiuer*.

Experiment Solitary touching the *Super-Reflection* of *Echo's*. 794

THere is, in the *City* of *Ticinum*, in *Italy*, a *Church*, that hath Windowes only from aboue: It is in Length an Hundred Feet, in Breadth Twenty Feet, and in Height neere Fifty; Hauing a *Doore* in the Middeſt. It reporteth the *Voice*, twelue, or thirteene times, if you ſtand by the Cloſe *End Wall*, ouer againſt the *Doore*. The *Eccho* fadeth and dyeth by little and little, as the *Eccho* at *Pont-charenton* doth. And the *Voice* ſounderh, as if it came from aboue the *Doore*. And if you ſtand at the *Lower End*, or on either *Side* of the *Doore*, the *Eccho* holdeth; But if you ſtand in the *Doore*, or in the *Middeſt* iuſt ouer againſt the *Doore*, not. Note that all *Eccho's* ſound better againſt *Old Wals*, than *New*; Becauſe they are more *Dry* and *Hollow*.

Experiment Solitary touching the *Force* of *Imagination*, *Imitating* that of the *Senſe*. 795

THoſe *Effects*, which are wrought by the *Percuſſion* of the *Senſe*, and by *Things* in *Fact*, are produced likewiſe in ſome degree, by the *Imagination*. Therefore if a Man ſee another eat *Sowre* or *Acide Things*, which ſet the *Teeth* on edge, this *Obiect* tainteth the *Imagination*. So that he that ſeeth the *Thing* done by another, hath his owne *Teeth* alſo ſet on edge. So if a Man ſee another turne ſwiftly, and long; Or if hee looke vpon *Wheeles* that turne, Himſelfe waxeth *Turne-ſicke*. So if a Man bee vpon an *High Place*, without *Railes*, or good Hold, except he be vſed to it, he is Ready to Fall: For *Imagining* a *Fall*, it putteth his *Spirits* into the very *Action* of a *Fall*. So Many vpon the *Seeing* of others *Bleed*, or *Strangled*, or *Tortured*, Themſelues are ready to faint, as if they *Bled*, or were in *Strife*.

Experiment Solitary, touching *Preſeruation* of *Bodies*. 796

TAke a *Stock-Gilly-Flower*, and tie it gently vpon a Sticke, and put them both into a *Stoop-Glaſſe*, full of *Quick-ſiluer*, ſo that the *Flower* be couered: Then lay a little *Weight* vpon the Top of the *Glaſſe*, that may keepe the Sticke downe; And look vpon them after foure or fiue daies; And you ſhall finde the *Flower* Freſh, and the *Stalke* Harder, and leſſe *Flexible* than it was. If you compare it with another *Flower*, gathered at the ſame time, it will be the more manifeſt. This ſheweth, that *Bodies* doe preſerue excellently in *Quick-ſiluer*, And not preſerue only, but, by the *Coldneſſe* of the *Quick-ſiluer*, *Indurate*; For the *Freſhneſſe* of the *Flower* may be meerely *Conſeruation*; (which is the more to be obſerued, becauſe the *Quick-ſiluer* preſſeth the *Flower*;) But the *Stiffeneſſe* of the *Stalke* cannot be without *Induration*, from the Cold (as it ſeemeth,) of the *Quick-ſiluer*.

Experiment Solitary touching the *Growth*, or *Multiplying* of *Metals*. 797

IT is reported by ſome of the *Ancients*, that in *Cyprus*, there is a *Kinde* of *Iron*, that being cut into *Little Peeces*, and put into the *Ground*, if it be well *Watred*, will increaſe into *Greater Peeces*. This is certaine, and knowne of Old; That *Lead* will multiply, and Increaſe; As hath beene ſeene in *Old Statua's* of *Stone*, which haue beene put in *Cellars*; The *Feet* of them being bound with *Leaden Bands*; Where (after a time) there appeared, that the *Lead* did ſwell; Inſomuch as it hanged vpon the *Stone* like *Warts*.

Experiment Solitary touching the *Drowning* of the *more Baſe Metall* in the *more Precious*. 798

I Call *Drowning* of *Metals*, when that the *Baſer Metall*, is ſo incorporate with the more *Rich*, as it can by no meanes be ſeparated againe: which is a kinde of *Verſion*, though Falſe: As if *Siluer* ſhould be inſeparably incorporated with *Gold*; Or *Copper*, and *Lead*, with *Siluer*. The Ancient *Electrum* had in it a Fifth of *Siluer* to the *Gold*; And made a *Compound Metall*, as fit for moſt vſes, as *Gold*; And more Reſplendent, and more Qualified in ſome other Properties; But then that was eaſily Separated. This to doe priuily, or to make the *Compound* paſſe for the *Rich Mettall* Simple, is an *Adulteration*, or *Counterfeiting*: But if it be done Auowedly, and without Diſguizing, it may be a great *Sauing* of the

the *Richer Metall*. I remember to haue heard of a Man, skilfull in *Metals*, that a Fifteenth Part of *Siluer*, incorporate with *Gold*, will not be Recouered by any *Water* of *Separation*; Except you put a Greater *Quantitie* of *Siluer*, to draw to it the Leſſe; which (he ſaid) is the laſt Refuge in *Separations*. But that is a tedious way, which no Man (almoſt) will thinke on. This would be better enquired; And the *Quantitie* of the Fifteenth turned to a Twentieth; And likewiſe with ſome little *Additionall*, that may further the *Intrinſique Incorporation*. Note that *Siluer* in *Gold* will be detected by *weight*, compared with the *Dimenſion*; But *Lead* in *Siluer*, (*Lead* being the *weightier Metall*,) will not bee detected; If you take ſo much the more *Siluer*, as will counteruaile the *Ouer-Weight* of the *Lead*.

Experiment Solitary touching *Fixation* of *Bodies*. 799

Gold is the only *Subſtance*, which hath nothing in it *Volatile*, and yet melteth without much difficulty. The *Melting* ſheweth that it is not leiune, or Scarce in *Spirit*. So that the *Fixing* of it, is not *Want* of *Spirit* to fly out, but the *Equall Spreading* of the *Tangible Parts*, and the *Cloſe Coaceruation* of them: Whereby they haue the leſſe Appetite, and no meanes (at all) to iſſue forth. It were good therefore to try, whether *Glaſſe Re-Moulten* doe leeſe any *weight*? For the *Parts* in *Glaſſe* are euenly Spred; But they are not ſo Cloſe as in *Gold*; As wee ſee by the Eaſie Admiſſion of *Light*, *Heat*, and *Cold*; And by the *Smalneſſe* of the *Weight*. There bee other *Bodies*, *Fixed*, which haue little or no *Spirit*: So as there is nothing to fly out; As wee ſee in the *Stuffe*, whereof *Copples* are made; Which they put into *Furnaces*; Vpon which *Fire* worketh not: So that there are three *Cauſes* of *Fixation*; The Euen *Spreading* both of the *Spirits*, and *Tangible Parts*; The *Cloſeneſſe* of the *Tangible Parts*; And the *Ieiuneneſſe* or *Extreme Comminution* of *Spirits*: Of which Three, the Two Firſt may be ioyned with a *Nature Liqueſiable*; The Laſt not.

Experiment Solitary touching the *Reſtleſſe Nature* of Things in *Themſelues*, and their *Deſire* to *change*. 800

It is a Profound *Contemplation* in *Nature*, to conſider of the *Emptineſſe* (as we may call it) or *Inſatisfaction* of ſeuerall *Bodies*; And of their *Appetite* to take in Others. *Aire* taketh in *Lights*, and *Sounds*, and *Smels*, and *Vapours*; And it is moſt manifeſt, that it doth it, with a kinde of Thirſt, as not ſatisfied with his owne former Conſiſtence; For elſe it would never receive them in ſo ſuddenly, and eaſily. *Water* and all *Liquors*, doe haſtily receive *Dry* and more *Terreſtriall Bodies*, Proportionable: And *Dry Bodies*, on the other ſide, drinke in *Waters*, and *Liquors*: So that, (as it is well ſaid, by one of the *Ancients*, of *Earthly* and *Watry Subſtances*,) *One is a Glue to another*. *Parchment*, *Skins*, *Cloth*, &c. drinke in *Liquors*, though themſelues be *Entire Bodies*, and not *Comminuted*, as *Sand* and *Aſhes*; Not apparently Porous: *Metals* themſelues doe receiue in readily *Strong-Waters*; And *Strong-Waters* likewiſe doe readily pierce into *Metals*, and *Stones*: And that *Strong-water* will touch vpon *Gold*, that will not touch vpon *Siluer*; And *è conuerſo*. And *Gold*,

which ſeemeth by the *weight* to bee the Cloſeſt, and moſt Solid *Body*, doth greedily drinke in *Quick-Siluer*. And it ſeemeth, that this *Reception* of other *Bodies*, is not Violent: For it is (many times) Reciprocall, and as it were with Conſent. Of the *Cauſe* of this, and to what *Axiome* it may be referred, conſider attentiuely; For as for the Prettie Aſſertion, that *Matter* is like a *Common Strumpet*, that deſireth all *Formes*, it is but a *Wandring Notion*. Onely *Flame* doth not content it ſelfe to take in any other *Body*; But either, to ouercome and turne another *Body* into it Selfe, as by Victorie; Or it Selfe to dye, and goe out.

(***)

NATV-

NATVRALL HISTORIE.

IX. Century.

IT is certaine, that all *Bodies* whatsoeuer, though they haue no *Sense*, yet they haue *Perception*: For when one *Body* is applied to another, there is a Kinde of *Election*, to embrace that which is Agreeable, and to exclude or expell that which is Ingrate: And whether the *Body* bee *Alterant*, or *Altered*, euermore a *Perception* precedeth *Operation*: For else all *Bodies* would be alike One to Another. And sometimes this *Perception* in some Kinde of *Bodies*, is farre more Subtill than the *Sense*; So that the *Sense* is but a dull Thing in Comparison of it: Wee see a *Weather-Glasse*, will finde the least difference of the *Weather*, in *Heat*, or *Cold*, when Men finde it not. And this *Perception* also, is sometimes at *Distance*, as well as vpon the *Touch*; As when the *Load-Stone* draweth *Iron*, or

Experiments in Consort, touching *Perception* in *Bodies Insensible*, tending to *Natural Diuination*, or *Subtill Trialls*.

Flame fireth *Naphtha* of *Babylon*, a great diſtance off. It is therfore a *Subiect* of a very *Noble Enquiry*, to enquire of the more *Subtill Perceptions*; For it is another *Key* to open *Nature*, as well as the *Senſe*; And ſometimes Better. And beſides, it is a Principall *Meanes* of *Naturall Diuination*; For that which in theſe *Perceptions* appeareth early, in the great *Effects* commeth long after. It is true alſo, that it ſerueth to *diſcouer* that which is *Hid*, as well as to *foretell* that which is to *Come*; As it is in many *Subtill Trialls*; As to try whether *Seeds* be old, or new, the *Senſe* cannot informe: But if you boile them in *Water*, the New *Seeds* will ſprout ſooner: And ſo of *Water*, the *Taſte* will not diſcouer the beſt *Water*; But the *Speedy Conſuming* of it, and many other *Meanes* which we haue heretofore ſet downe, will diſcouer it. So in all *Phyſiognomy*, the *Lineaments* of the *Body* will diſcouer thoſe *Naturall Inclinations* of the *Minde*, which *Diſſimulation* will conceale, or *Diſcipline* will ſuppreſſe. Wee ſhall therefore now handle only, thoſe two *Perceptions*, which pertaine to *Naturall Diuination*, and *Diſcouery*: Leauing the Handling of *Perception* in other Things to be diſpoſed Elſewhere. Now it is true, that *Diuination* is attained by other *Meanes*; As if you know the *Cauſes*; If you know the *Concomitants*; you may iudge of the *Effect* to follow: And the like may be ſaid of *Diſcouery*; But we tie our Selues here, to that *Diuination* and *Diſcouery* chiefly, which is Cauſed by an *Early*, or *Subtill Perception*.

The *Aptneſſe* or *Propenſion* of *Aire*, or *Water*, to Corrupt or Putrifie, (no doubt,) is to be found before it breaketh forth into manifeſt *Effects* of *Diſeaſes*, *Blaſtings*, or the like. Wee will therefore ſet downe ſome *Prognoſticks* of *Peſtilentiall* and *Vnwholeſome Yeares*.

801 The *wind* blowing much from the *South*, without *Raine*; And *Wormes* in the *Oake-Apple*; haue beene ſpoken of before. Alſo the *Plenty* of *Frogs*, *Graſhoppers*, *Flies*, and the like *Creatures* bred of *Putrifaction*, doth portend *Peſtilentiall Yeares*.

802 *Great*, and *Early Heats* in the *Spring*, (and namely in *May*,) without *Winds*, portend the ſame; And generally ſo doe *Yeares* with little *wind*, or *Thunder*.

Great

Great Droughts in *Summer*, lasting till towards the *End* of *August*, and some *Gentle Showers* vpon them; And then some *Drie weather* againe; Doe portend a *Pestilent Summer*, the *Yeare* following: For about the *End* of *August*, all the *Sweetnesse* of the *Earth*, which goeth into *Plants*, and *Trees* is exhaled; (And much more if the *August* be drie;) So that nothing then can breathe forth of the *Earth*, but a grosse *Vapour*, which is apt to Corrupt the *Aire*: And that *Vapour*, by the first *Showers*, if they be *Gentle*, is released, and commeth forth abundantly. Therefore they that come abroad soone after those *Showers*, are commonly taken with *Sickenesse*: And in *Affricke*, no Bodie will stirre out of doores, after the first *Showers*. But if the *Showers* come vehemently, then they rather wash and fill the *Earth*, than giue it leaue to breathe forth presently. But if *Dry Weather* come againe, then it fixeth and continueth the *Corruption* of the *Aire*, vpon the first *Showers* begun; And maketh it of ill *Influence*, euen to the Next *Summer*; Except a very *Frosty Winter* discharge it, Which seldome succeedeth such *Drought*. 803

The *Lesser Infections*, of the *Small Pockes*, *Purple Feuers*, *Agues*, in the *Summer Precedent*, and houering all *winter*, doe portend a great *Pestilence* in the *Summer* following, For *Putrifaction* doth not rise to his heighth at once. 804

It were good to lay a *Peece* of *Raw Flesh*, or *Fish*, in the *Open Aire*; And if it Putrifie quickly, it is a *Signe* of a *Disposition* in the *Aire* to *Putrifaction*. And becausse you cannot be informed, whether the *Putrifaction* be quicke or late, except you compare this *Experiment* with the like *Experiment* in another *Yeare*, it were not amisse, in the same *Yeare*, and at the same *Time*, to lay one *Peece* of *Flesh*, or *Fish*, in the *Open Aire*, and another of the same Kinde and Bignesse, within *Doores*: For I iudge, that if a generall *Disposition* be in the *Aire* to Putrifie, the *Flesh*, or *Fish*, will sooner Putrifie abroad, where the *Aire* hath more power, than in the *House*, where it hath lesse, being many wayes corrected. And this *Experiment* would be made about the *End* of *March*: For that *Season* is likest to discouer, what the *Winter* hath done; And what the *Summer* following will doe vpon the *Aire*. And becausse the *Aire* (no doubt) receiueth great *Tincture*, and *Infusion* from the *Earth*; It were good to trie that *Exposing* of *Flesh*, or *Fish*, both vpon a *Stake* of *Wood*, some heighth aboue the *Earth*, and vpon the *Flat* of the *Earth*. 805

Take *May-Dew*, and see whether it putrifie quickly, or no? For that likewise may disclose the *Qualitie* of the *Aire*, and *Vapour* of the *Earth*, more or lesse *Corrupted*. 806

A *Drie March*, and a *Drie May*, portend a *Wholesome Summer*, if there be a *Showring Aprill* betweene: But otherwise, it is a *Signe* of a *Pestilentiall Yeare*. 807

As the *Discouery* of the *Disposition* of the *Aire*, is good for the *Prognostickes* of *wholesome*, and *Vnwholesome Yeares*; So it is of much more vse, for the *Choice* of *Places* to dwell in: At the least, for *Lodges*, and *Retiring Places* for *Health*; (For *Mansion Houses* respect *Prouisions*, as well 808

as

as *Health*; Wherein the *Experiments* aboue mentioned may ſerue.

809 But for the *Choice* of *Places*, or *Seats*, it is good to make Triall, not onely of *Aptneſſe* of *Aire* to corrupt, but alſo of the *Moiſture* and *Drineſſe* of the *Aire*; and the *Temper* of it, in *Heat*, or *Gold*; For that may concerne *Health* diuerſly. We ſee that there be ſome *Houſes*, wherein *Sweet Meats* will relent, and *Baked Meats* will mould, more than in others; And *Wainſcots* will alſo ſweat more; ſo that they will almoſt run with *Water*: All which, (no doubt,) are cauſed chiefly by the *Moiſtneſſe* of the *Aire*, in thoſe *Seats*. But becauſe it is better to know it, before a *Man* buildeth his *Houſe*, than to finde it after, take the *Experiments* following.

810 Lay *Wooll*, or a *Sponge*, or *Bread*, in the *Place* you would try, comparing it with ſome other *Places*; And ſee whether it doth not moiſten, and make the *Wooll*, or *Sponge*, &c. more Ponderous, than the other? And if it doe, you may iudge of that Place, as Situate in a *Groſſe*, and *Moiſt Aire*.

811 Becauſe it is certaine, that in ſome *Places*, either by the *Nature* of the *Earth*, or by the *Situation* of *Woods*, and *Hills*, the *Aire* is more Vnequall, than in Others; And *Inequality* of *Aire* is euer an Enemy to *Health*; It were good to take two *Weather-Glaſſes*, Matches in all things, and to ſet them for the ſame Houres of One day, in ſeuerall *Places* where no *Shade* is, nor *Encloſures*: And to marke when you ſet them, how farre the *Water* commeth; And to compare them, when you come againe, how the *Water* ſtandeth then: and if you finde them *Vnequall*, you may be ſure that the *Place* where the *Water* is loweſt, is in the *Warmer Aire*, and the other in the *Colder*. And the greater the *Inequality* bee, of the *Aſcent*, or *Deſcent* of the *Water*, the greater is the *Inequality* of the *Temper* of the *Aire*.

812 The *Predictions* likewiſe of *Cold* and *Long Winters*, and *Hot* and *Dry Summers*, are good to be knowne; As well for the *Diſcouery* of the *Cauſes*, as for diuers *Prouiſions*. That of *Plenty* of *Hawes*, and *Heps*, and *Briar-Berries*, hath beene ſpoken of before. If *Wainſcot*, or *Stone*, that haue vſed to Sweat, be more dry, in the Beginning of *Winter*; Or the *Drops* of the *Eaues* of *Houſes* come more ſlowly downe, than they vſe; it portendeth a *Hard*, and *Froſty Winter*. The *Cauſe* is, For that it ſheweth an *Inclination* of the *Aire*, to *Dry Weather*; which in *Winter* is euer ioyned with *Froſt*.

813 Generally, a *Moiſt* and *Coole Summer*, portendeth a *Hard Winter*. The *Cauſe* is, for that the *Vapours* of the *Earth*, are not diſſipated in the *Summer* by the *Sunne*; And ſo they rebound vpon the *Winter*.

814 A *Hot* and *Dry Summer*, and *Autumne*, and eſpecially if the *Heat* and *Drought* extend farre into *September*, portendeth an Open Beginning of *Winter*; And *Colds* to ſucceed, toward the latter Part of the *Winter*, and the Beginning of the *Spring*: For till then, the former *Heat* and *Drought* beare the Sway; And the *Vapours* are not ſufficiently Multiplied.

815 An *Open* and *Warme Winter* portendeth a *Hot* and *Dry Summer*: For the *Vapours* diſperſe into the *Winter Showers*; Whereas *Cold* and *Froſt* keepeth

keepeth them in, and transporteth them into the late *Spring*, and *Summer* following.

816 *Birds* that vse to change *Countries*, at certaine *Seasons*, if they come Earlier, doe shew the *Temperature* of *Weather*, according to that *Countrey* whence they came: As the *Winter-Birds*, (namely *Woodcockes*, *Feldefares*, &c.) if they come earlier, and out of the *Northerne Countries*, with vs shew *Cold Winters*. And if it be in the same *Countrey*, then they shew a *Temperature* of *Season*, like vnto that *Season* in which they come: As *Swallowes*, *Bats*, *Cuckooes*, &c. that come towards *Summer*, if they come early, shew a *Hot Summer* to follow.

817 The *Prognostickes*, more Immediate, of *Weather* to follow soone after, are more Certaine than those of *Seasons*. The *Resounding* of the *Sea* vpon the *Shoare*; And the *Murmur* of *Winds* in the *Woods*, without apparent *Wind*; shew *Wind* to follow: For such *Winds*, breathing chiefly out of the *Earth*, are not at the first perceiued, except they bee pent, by *Water*, or *Wood*. And therefore a *Murmur* out of *Canes* likewise portendeth as much.

818 The *Vpper Regions* of the *Aire*, perceiue the *Collection* of the *Matter* of *Tempest*, and *Winds*, before the *Aire* here below: And therefore the *Obscuring* of the *Smaller Starres* is a *Signe* of *Tempests* following. And of this kinde you shall finde a Number of *Instances* in our *Inquisition De Ventis*.

819 *Great Mountaines* haue a *Perception* of the *Disposition* of the *Aire* to *Tempests*, sooner than the *Valley's* or *Plaines* below: And therefore they say in *Wales*, when certaine *Hills* haue their *Night-Caps* on, they meane Mischiefe. The *Cause* is, for that *Tempests*, which are for the most Part bred aboue, in the *Middle Region*, (as they call it,) are soonest perceiued to collect in the *Places* next it.

820 The *Aire*, and *Fire*, haue *Subtill Perceptions* of *Wind Rising*, before *Men* finde it. We see the *Trembling* of a *Candle* will discouer a *Wind* that otherwise wee doe not feele; And the *Flexuous Burning* of *Flames* doth shew the *Aire* beginneth to be vnquiet; And so doe *Coales* of *Fire* by Casting off the *Ashes* more than they vse. The *Cause* is, for that no *Wind*, at the first, till it hath strooke and driuen the *Aire*, is Apparent to the *Sense*: But *Flame* is easier to moue, than *Aire*: And for the *Ashes*, it is no maruell, though *Wind* unperceiued shake them off; For wee vsually trie, which way the *Wind* bloweth, by casting vp *Grasse*, or *Chaffe*, or such light Things, into the *Aire*.

821 When *Wind* expireth from vnder the *Sea*; As it causeth some *Resounding* of the *Water*, (whereof wee spake before,) so it causeth some *Light Motions* of *Bubbles*, and *White Circles* of *Froth*. The *Cause* is, for that the *Wind* cannot be perceiued by the *Sense*, vntill there bee an *Eruption* of a great *Quantitie*, from vnder the *Water*; And so it getteth into a *Bodie*: Whereas in the first *Putting vp* it commeth in little Portions.

822 We spake of the *Ashes*, that *Coales*, cast off; And of *Grasse*, and *Chaffe* carried by the *Wind*; So any *Light Thing* that moueth; when we finde no

wind,

Wind, ſheweth a *Wind* at hand; As when *Feathers*, or *Downe* of *Thiſtles*, fly to and fro in the *Aire*.

For *Prognoſtickes* of *Weather* from *Liuing Creatures*, it is to be noted; That *Creatures* that Liue in the *Open Aire*, (*Sub Diô*,) muſt needs haue a Quicker *Impreſſion* from the *Aire*, than *Men* that liue moſt within *Doores*; And eſpecially *Birds*, who liue in the *Aire*, freeſt, and cleareſt; And are apteſt by their *Voyce*, to tell Tales, what they finde; And likewiſe by the *Motion* of their *Flight* to expreſſe the ſame.

823 *Water-Fowles*, (as *Sea-Gulls*, *More-Hens*, &c.) when they flocke and fly together, from the *Sea* towards the *Shoares*, And contrariwiſe, *Land-Birds*, (as *Crowes*, *Swallowes*, &c.) when they fly from the *Land* to the *Waters*, and beat the *waters* with their *wings*; doe fore-ſhew *Raine*, and *Wind*. The *Cauſe* is, *Pleaſure*, that both Kindes take in the *Moiſtneſſe*, and *Denſitie* of the *Aire*: And ſo deſire to be in *Motion*, and vpon the *wing*, whither ſoever they would otherwiſe goe: For it is no Maruell, that *Water-Fowle* doe ioy moſt in that *Aire*, which is likeſt *Water*; And *Land-Birds* alſo, (many of them,) delight in *Bathing*, and *Moiſt Aire*. For the ſame Reaſon alſo, many *Birds* doe proine their *Feathers*; And *Geeſe* doe gaggle; And *Crowes* ſeeme to call upon *Raine*: All which is but the Comfort they ſeeme to receiue in the *Relenting* of the *Aire*.

824 The *Heron*, when ſhee ſoareth high, (ſo as ſometimes ſhee is ſeene to paſſe ouer a *Cloud*,) ſheweth *Winds*: But *Kites* flying aloft, ſhew *Faire* and *Drie weather*. The *Cauſe* may bee, for that they both mount moſt into the *Aire*, of that Temper, wherein they delight: And the *Heron*, being a *water-Fowle*, taketh pleaſure in the *Aire*, that is Condenſed: And beſides, being but Heauie of *wing*, needeth the Helpe of the *Groſſer Aire*. But the *Kite* affecteth not ſo much the *Groſſeneſſe* of the *Aire*, as the *Cold* and *Freſhneſſe* thereof; For being a *Bird* of *Prey*, and therefore *Hot*, ſhee delighteth in the *Freſh Aire*; And (many times) flyeth againſt the *Wind*, As *Trouts*, and *Salmons* ſwimme againſt the Streame. And yet it is true alſo, that all *Birds* finde an Eaſe in the depth of the *Aire*; As *Swimmers* doe in a Deepe *Water*. And therefore when they are aloft, they can vphold themſelues with their *wings Spred*, ſcarce moouing them.

825 *Fiſhes*, when they play towards the *Top* of the *Water*, doe commonly foretell *Raine*. The *Cauſe* is, for that a *Fiſh* hating the *Drie*, will not approach the *Aire*, till it groweth *Moiſt*; And when it is *Drie*, will fly it, and *Swimme* Lower.

826 *Beaſts* doe take Comfort, (generally,) in a *Moiſt Aire*; And it maketh them eat their *Meat* better: And therefore *Sheepe* will get vp betimes in the Morning, to feed, againſt *Raine*: And *Cattell*, and *Deere*, and *Conneyes*, will feed hard before *Raine*: And a *Heifer*, will put vp his *Noſe*, and ſnuffe in the *Aire*, againſt *Raine*.

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The *Trifoile*, againſt *Raine*, ſwelleth in the *Stalke*, and ſo ſtandeth more vpright; For by *Wet*, *Stalkes* doe erect, and *Leaues* bow downe. There is a Small Red *Flower* in the *Stubble-Fields*, which Country People call the *Wincopipe*; Which if it open in the *Morning*, you may be ſure of a faire *Day* to follow. 827

Euen in *Men*, *Aches*, and *Hurts*, and *Cornes*, doe engrieue, either towards *Raine*, or towards *Froſt*: For the one maketh the *Humours* more to Abound; And the Other maketh them Sharper. So we ſee both *Extremes* bring the *Gout*. 828

Wormes, *Vermine*, &c. doe fore-ſhew (likewiſe) *Raine*: For *Earth-wormes* will come forth, and *Moules* will caſt vp more, and *Fleas* bite more, againſt *Raine*. 829

Solide Bodies likewiſe fore-ſhew *Raine*. As *Stones*, and *Wainſcot*, when they *Sweat*: And *Boxes*, and *Pegs* of *Wood*, when they Draw, and *Winde hard*; Though the former be but from an outward Cauſe; For that the *Stone*, or *Wainſcot*, turneth and beateth backe the *Aire* againſt it ſelfe; But the latter is an *Inward Swelling* of the *Body* of the *Wood* it ſelfe. 830

Experiment Solitary touching the *Nature* of *Appetite* in the *Stomach*. 831

Appetite is moued chiefly by Things that are *Cold*, and *Drie*: The *Cauſe* is, for that *Cold* is a Kinde of *Indigence* of *Nature*, and calleth vpon Supply; And ſo is *Drineſſe*: And therefore all *Soure Things*, as *Vinegar*, *Iuyce* of *Limons*, *Oyle* of *Vitriol*, &c.) prouoke *Appetite*. And the *Diſeaſe*, which they call *Appetitus Caninus*, conſiſteth in the *Matter* of an *Acide* and *Glaſſie Flegme*, in the *Mouth* of the *Stomach*. *Appetite* is alſo moued by *Soure Things*; For that *Sowre Things*, induce a *Contraction* in the *Nerues*, placed in the *Mouth* of the *Stomach*; Which is a great *Cauſe* of *Appetite*. As for the *Cauſe*, why *Onions*, and *Salt*, and *Pepper*, in Baked Meats, moue *Appetite*, it is by *Vellication* of thoſe *Nerues*; For *Motion* whetteth. As for *Worme-wood*, *Olives*, *Capers*, and others of that kinde, which participate of *Bitterneſſe*, they moue *Appetite* by *Abſterſion*. So as there be foure Principall *Cauſes* of *Appetite*; The *Refrigeration* of the *Stomach*, ioyned with ſome *Drineſſe*; *Contraction*; *Vellication*; And *Abſterſion*: Beſides *Hunger*, which is an *Emptineſſe*: And yet *Ouer-Faſting* doth (many times) cauſe the *Appetite* to ceaſe; For that *Want* of *Meat* maketh the *Stomach* draw *Humours*; And ſuch *Humours* as are Light, and Cholericke, which quench *Appetite* moſt.

Experiment Solitary touching *Sweetneſſe* of *Odour* from the *Raine-bow*. 832

IT hath beene obſerued by the *Ancients*, that where a *Rain-Bow*, ſeemeth to hang ouer, or to touch, there breatheth forth a *Sweet Smell*. The *Cauſe* is, for that this happeneth but in certaine Matters, which haue in themſelues ſome *Sweetneſſe*; Which the *Gentle Dew* of the *Rain-Bow* doth draw forth: And the like doe *Soft Showers*; For they alſo make the *Grounds* Sweet: But none are ſo delicate as the *Dew* of the *Rain-Bow*, where it falleth. It may be alſo, that the *Water* it ſelfe hath ſome *Sweetneſſe*: For the *Rain-Bow* conſiſteth of a *Glomeration* of *Small Drops*, which cannot poſſibly fall, but from the *Aire*, that is very *Low*: And there-

therefore may hold the very *Sweetneſſe* of the *Herbs*, and *Flowers*, as a *Diſtilled water*: For *Raine*, and other *Dew*, that fall from high, cannot preſerue the Smell, being diſſipated in the drawing vp: Neither doe we know, whether ſome *water* it ſelfe, may not haue ſome degree of *Sweetneſſe*. It is true that we finde it ſenſibly in no *Poole*, *Riuer*, nor *Fountaine*; But good *Earth*, newly turned vp, hath a *Freſhneſſe*, and good *Sent*; Which *Water*, if it be not too *Equall*, (For *Equall Obiects* neuer moue the *Senſe*,) may alſo haue. Certaine it is, that *Bay-Salt*, which is but a kinde of *water Congealed*, will ſometimes ſmell like *Violets*.

Experiment Solitary touching *Sweet Smells*. 833

TO *Sweet Smells Heat* is requiſite, to Concoct the *Matter*; And ſome *Moiſture* to Spread the *Breath* of them. For *Heat*, we ſee that *Woods*, and *Spices*, are more *Odorate* in the *Hot Countries*, than in the *Cold*: For *Moiſture*, we ſee that things too much Dried, loſe their *Sweetneſſe*: And *Flowers* growing, ſmell better in a *Morning*, or *Euening*, than at *Noone*. Some *Sweet Smells* are deſtroyed by Approach to the *Fire*; As *Violets*, *Wall-Flowers*, *Gilly-Flowers*, *Pinckes*; And generally all *Flowers* that haue *Coole* and *Delicate Spirits*. Some continue both on the *Fire*, and from the *Fire*, As *Roſe-Water*, &c. Some doe ſcarce come forth, or at leaſt not ſo pleaſantly, as by meanes of the *Fire*; as *Iuniper*, *Sweet Gums*, &c. And all *Smells*, that are Encloſed in a *Faſt Body*: But (generally) thoſe *Smells* are the moſt Gratefull, where the degree of *Heat* is Small; Or where the *Strength* of the *Smell* is allayed; For theſe *Things* doe rather wooe the *Senſe*, than Satiate it. And therefore the *Smell* of *Violets*, and *Roſes*, exceedeth in *Sweetneſſe* that of *Spices*, and *Gummes*; And the Strongeſt Sort of *Smells*, are beſt in a weſt, a farre off.

Experiment Solitary touching the *Corporeall Subſtance* of *Smells*. 834

IT is certaine, that no *Smell* iſſueth, but with *Emiſſion* of ſome *Corporeall Subſtance*; Not as it is in *Light*, and *Colours*, and in *Sounds*. For we ſee plainly, that *Smell* doth ſpread nothing that diſtance, that the other doe. It is true, that ſome *Woods* of *Orenges*, and *Heathes* of *Roſe-Mary*, will Smell a great way into the *Sea*, perhaps twenty Miles; But what is that, ſince a *Peale* of *Ordnance* will doe as much, which moueth in a ſmall compaſſe? Whereas thoſe *Woods*, and *Heathes*, are of Vaſt Spaces: Beſides wee ſee that *Smells* doe adhere to *Hard Bodies*; As in *Perfuming* of *Gloues*, &c. which ſheweth them *Corporeall*; And doe Laſt a great while, which *Sounds*, and *Light* doe not.

Experiment Solitary touching *Fetide* and *Fragrant Odours*. 835

THe *Excrements* of moſt *Creatures* Smell ill; Chiefly to the ſame *Creature* that voideth them: For we ſee, beſides that of *Man*, that *Pigeons* and *Horſes* thriue beſt, if their *Houſes* and *Stables* be kept Sweet; And ſo of *Cage-Birds*: And the *Cat* burieth that which ſhee voydeth: And it holdeth chiefly in thoſe *Beaſts*, which feed vpon *Fleſh*. *Dogs* (almoſt) onely of *Beaſts*, delight in *Fetide Odours*; Which ſheweth there is ſomewhat in their *Senſe* of *Smell*, differing from the *Smells* of other *Beaſts*. But the *Cauſe*, why *Excrements* ſmell ill, is manifeſt; For that the *Body*

Body it selfe reiected them; Much more the *Spirits*: And we see, that those *Excrements*, that are of the *First Digestion*, Smell the worst; As the *Excrements* from the *Belly*: Those that are from the *Second Digestion*, lesse ill; As *Vrine*; And those that are from the *Third*, yet lesse; For *Sweat* is not so bad, as the other two; Especially of some *Persons*, that are full of *Heat*. Likewise most *Putrifactions* are of an *Odious Smell*: For they smell either *Fetide*, or *Mouldy*. The *Cause* may be, for that *Putrifaction* doth bring forth such a *Consistence*, as is most Contrary to the *Consistence* of the *Body*, whilst it is Sound: For it is a meere dissolution of that *Forme*. Besides, there is another Reason which is Profound: And it is that the *Obiects* that please any of the *Senses*, haue (all) some *Equality*, and (as it were) *Order*, in their *Composition*: But where those are wanting, the *Obiect* is euer Ingrate. So *Mixture* of many *Disagreeing Colours* is euer vnpleasant to the *Eye*: *Mixture* of *Discordant Sounds* is vnpleasant to the *Eare*: *Mixture*, or *Hotch-Potch* of many *Tastes*, is vnpleasant to the *Taste*: *Harshnesse* and *Ruggednesse* of *Bodies*, is vnpleasant to the *Touch*: Now it is certaine, that all *Putrifaction*, being a *Dissolution* of the first *Forme*, is a meere *Confusion*, and *Vnformed Mixture* of the *Part*. Neuertheless it is strange, and seemeth to Crosse the former *Obseruation*, that some *Putrifactions* and *Excrements* doe yeeld *Excellent Odours*; As *Ciuet* and *Muske*; And as some thinke *Amber-Greece*: For diuers take it, (though vnprobably) to come from the *Sperme* of *Fish*: And the *Mosse* we spake of from *Apple-Trees*, is little better than an *Excretion*. The Reason may be, for that there passeth in the *Excrements*, and remaineth in the *Putrifactions*, some good *Spirits*; especially where they proceed from *Creatures*, that are very *Hot*. But it may be also ioyned with a further *Cause*, which is more Subtill; And it is, that the *Senses* loue not to bee Ouerpleased; But to haue a *Commixture* of somewhat that is in it selfe Ingrate. Certainly, we see how *Discords* in *Musicke*, falling vpon *Concords*, make the *Sweetest Straines*: And we see againe, what Strange *Tastes* delight the *Taste*; As *Red-Herrings*, *Caueary*, *Parmizan*, &c. And it may be, the same holdeth in *Smels*. For those kinde of *Smels*, that we haue mentioned, are all Strong, and doe Pull and Vellicate the *Sense*. And wee finde also, that *Places* where Men *Vrine*, commonly haue some *Smell* of *Violets*: And *Vrine*, if one hath eaten *Nutmeg*, hath so too.

The Sloathfull, Generall, and Indefinite *Contemplations*, and *Notions*, of the *Elements*, and their *Coniugations*; Of the *Influences* of *Heauen*; Of *Heat*, *Cold*, *Moisture*, *Drought*; *Qualities Actiue*, *Passiue*; And the like; haue swallowed vp the true *Passages*, and *Processes*, and *Affects*, and *Consistences* of *Matter*, and *Naturall Bodies*. Therefore they are to be set aside, being

but *Notionall*, and *ill Limited*; And Definite *Axiomes* are to be drawne out of *Meaſured Inſtances:* And ſo Aſſent to bee made to the more *Generall Axiomes*, by *Scale*. And of theſe Kindes of *Proceſſes* of *Natures* and *Characters* of *Matter*, we will now ſet downe ſome *Inſtances*.

Experiment Solitary, touching the *Cauſes* of *Putrifaction*. 836

ALL *Putrifaction* come chiefly from the *Inward Spirits* of the *Body*; And partly alſo from the *Ambient Body*, be it *Aire*, *Liquor*, or whatſoeuer elſe. And this laſt, by two *Meanes:* Either by *Ingreſſe* of the *Subſtance* of the *Ambient Body*, into the *Body Putrified*; Or by *Excitation* and *Sollicitation* of the *Body Putrified*, and the *Parts* thereof, by the *Body Ambient*. As for the Receiued Opinion, that *Putrifaction* is cauſed, either by *Cold*, or *Peregrine* and *Preternaturall Heat*, it is but Nugation: For *Cold* in *Things Inanimate*, is the greateſt Enemy that is, to *Putrifaction*; though it extinguiſheth *Viuification*, which euer conſiſteth in *Spirits Attenuate*, which the *Cold* doth congeale, and coagulate. And as for the *Peregrine Heat*, it is thus farre true; That if the *Proportion* of the *Aduentiue Heat*, be greatly Predominant, to the *Naturall Heat*, and *Spirits* of the *Body*, it tendeth to *Diſſolution*, or Notable *Alteration*. But this is wrought by *Emiſſion*, or *Suppreſſion*, or *Suffocation*, of the *Natiue Spirits*; And alſo by the *Diſordination*, and *Diſcompoſture* of the *Tangible Parts*; And other *Paſſages* of *Nature*; And not by a *Conflict* of *Heats*.

Experiment Solitary touching *Bodies Vnperfectly Mixt*. 837

IN *Verſions* or *Maine Alterations* of *Bodies*, there is a *Medium* betweene the *Body*, as it is at firſt, and the *Body Reſulting*; which *Medium* is *Corpus imperfectè Miſtum*, and is Tranſitory, and not durable; As *Miſts*, *Smoaks*, *Vapours*, *Chylus* in the *Stomach*, *Liuing Creatures* in the firſt *Viuification:* And the *Middle Action*, which produceth ſuch *Imperfect Bodies*, is fitly called (by ſome of the *Ancients*) *Inquination*, or *Inconcoction*, which is a Kinde of *Putrifaction*; For the *Parts* are in *Confuſion*, till they ſettle one way, or other.

Experiment Solitary touching *Concoction* and *Crudity*. 838

THE word *Concoction*, or *Digeſtion*, is chiefly taken into vſe from *Liuing Creatures* and their *Organs*; And from thence extended to *Liquors*, and *Fruits*, &c. Therefore they ſpeake of *Meat Concocted*, *Vrine* and *Excrements Concocted*; And the *Foure Diſgeſtions*, (In the *Stomach*; In the *Liuer*; In the *Arteries* and *Nerues*; And in the *Seuerall Parts* of the *Body*;) are likewiſe called *Concoctions*: And they are all made to bee the Workes of *Heat:* All which *Notions* are but ignorant Catches of a few Things, which are moſt Obuious to *Mens Obſeruations*. The Conſtanteſt *Notion* of *Concoction* is, that it ſhould ſignifie the *Degrees* of *Alteration*, of one *Body* into another, from *Crudity* to perfect *Concoction*; Which is the *Vltimity* of that *Action* or *Proceſſe:* And while the *Body* to bee *Conuerted* and *Altered*, is too ſtrong for the *Efficient*, that ſhould *Conuert*, or *Alter* it, (whereby it reſiſteth and holdeth faſt in ſome degree the firſt *Forme*,

Forme, or *Consistence*) it is (all that while) *Crude*, and *Inconcoct*; And the *Processe* is to be called *Crudity* and *Inconcoction*. It is true, that *Concoction* is, in great part, the *Worke* of *Heat*; But not the *Worke* of *Heat* alone: For all Things, that further the *Conuersion*, or *Alteration*, (as *Rest*, *Mixture* of a *Body* already *Concocted*, &c.) are also *Meanes* to *Concoction*. And there are of *Concoction* two *Periods*; The one *Assimilation*, or *Absolute Conuersion*, and *Subaction*; The other *Maturation*: whereof the Former is most conspicuous in the *Bodies* of *Liuing Creatures*; In which there is an *Absolute Conuersion*, and *Assimilation* of the *Nourishment* into the *Body*: And likewise in the *Bodies* of *Plants*: And againe in *Metalls*, where there is a full *Transmutation*. The other (which is *Maturation*) is seene in *Liquors*, and *Fruits*; wherein there is not desired, nor pretended, an vtter *Conuersion*, but only an *Alteration* to that *Forme*, which is most sought, for *Mans* vse; As in *Clarifying* of *Drinkes*; *Ripening* of *Fruits*, &c. But note, that there be two Kindes of *Absolute Conuersions*; The one is, when a *Body* is conuerted into another *Body*, which was before; As when *Nourishment* is turned into *Flesh*; That is it which we call *Assimilation*. The other is, when the *Conuersion* is into a *Body* meerely New, and which was not before; As if *Siluer* should be turned to *Gold*; or *Iron* to *Copper*: And this *Conuersion* is better called, for distinctions sake, *Transmutation*.

THere are also diuers other *Great Alterations* of *Matter*, and *Bodies*, besides those that tend to *Concoction*, and *Maturation*; For whatsoeuer doth so alter a *Body*, as it returneth not againe to that it was, may be called *Alteratio Maior*: As when *Meat* is Boiled, or Roasted, or Fried, &c. Or when *Bread* and *Meat* are Baked; Or when *Cheese* is made of Curds, or *Butter* of *Creame*, or *Coales* of Wood, or *Brickes* of Earth; And a Number of others. But to apply *Notions Philosophicall* to *Plebeian Termes*; Or to say, where the *Notions* cannot fitly be reconciled, that there wanteth a *Terme*, or *Nomenclature* for it; (as the *Ancients* vsed;) They be but Shifts of *Ignorance*; For *Knowledge* will be euer a *Wandring* and *Indigested Thing*, if it be but a *Commixture* of a few *Notions*, that are at hand and occurre, and not excited from sufficient Number of Instances, and those well collated.

Experiment Solitary touching *Alterations*, which may bee called *Maiors*. 839

The *Consistences* of *Bodies* are very diuers: *Dense*, *Rare*; *Tangible*, *Pneumaticall*; *Volatile*, *Fixed*; *Determinate*, *Not Determinate*; *Hard*, *Soft*; *Cleauing*, Not *Cleauing*; *Congealeable*, *Not Congealeable*; *Liquefiable*, Not *Liquefiable*; *Fragile*, *Tough*; *Flexible*, *Inflexible*; *Tractile*, or to be drawne forth in length, *Intractile*; *Porous*, *Solid*; *Equall*, and *Smooth*, *Vnequall*; *Venous*, and *Fi-*

brous, and with *Graines*, *Entire*; And diuers Others; All which to referre to *Heat*, and *Cold*; and *Moisture*, and *Drought*, is a Compendious and Inutile *Speculation*. But of these see principally our *Abecedarium Naturæ*; And otherwise *Sparsim* in this our *Sylua Syluarum*: Neuertheless in some good part, Wee shall handle diuers of them now presently.

Experiment Solitary touching *Bodies Liquifiable, and not Liquefiable.* 840

Liquefiable, and *Not Liquefiable*, proceed from these *Causes*: *Liquefaction* is euer caused by the *Detention* of the *Spirits*, which play within the *Body*, and Open it. Therefore such *Bodies* as are more *Turgide* of *Spirit*; Or that haue their *Spirits* more *Straitly Imprisoned*; Or againe that hold them *Better Pleased*, and *Content*; are *Liquefiable*: For these three *Dispositions* of *Bodies*, doe arrest the *Emission* of the *Spirits*. An Example of the first two *Properties* is in *Metals*; And of the Last in *Grease*, *Pitch*, *Sulphure*, *Butter*, *Wax*, &c. The *Disposition* not to *Liquefie* proceedeth from the *Easie Emission* of the *Spirits*, whereby the *Grosser Parts* contract; And therefore, *Bodies Ieiune* of *Spirits*; Or which part with their *Spirits* more *Willingly*; are not *Liquefiable*; As *Wood*, *Clay*, *Free-Stone*, &c. But yet, euen many of those *Bodies*, that will not *Melt*, or will hardly *Melt*, will notwithstanding *Soften*; As *Iron* in the Forge; And a *Sticke* bathed in Hot Ashes, which thereby becommeth more Flexible. Moreouer, there are some *Bodies*, which doe *Liquefie*, or dissolue by *Fire*; As *Metals*, *Wax*, &c. And other *Bodies*, which dissolue in *Water*; As *Salt*, *Sugar*, &c. The *Cause* of the former proceedeth from the *Dilatation* of the *Spirits* by *Heat*: The *Cause* of the Latter proceedeth from the *Opening* of the *Tangible Parts*, which desire to receiue the *Liquour*. Againe, there are some *Bodies*, that dissolue with both; As *Gumme*, &c. And those be such *Bodies*, as on the One Side haue good store of *Spirit*; And on the other Side, haue the *Tangible Parts Indigent* of *Moisture*; For the former helpeth to the *Dilating* of the *Spirits* by the *Fire*; And the Latter stimulateth the Parts to Receiue the *Liquour*.

Experiment Solitary touching *Bodies Fragile*, and *Tough*. 841

OF *Bodies*, some are *Fragile*; And some are *Tough*, and *Not Fragile*; And in the *Breaking*, some *Fragile Bodies* breake but where the *Force* is, Some shatter and fly in many Peeces. Of *Fragilty* the *Cause* is an *Impotency* to be *Extended*: And therefore *Stone* is more *Fragile* than *Metall*; And so *Fictile Earth* is more *Fragile* than *Crude Earth*; And *Dry Wood* than *Greene*. And the *Cause* of this *Vnaptnesse* to *Extension*, is the Small *Quantity* of *Spirits*; (For it is the *Spirit* that furthereth the *Extension* or *Dilatation* of *Bodies*;) And it is euer Concomitant with *Porosity*, and with *Drinesse* in the *Tangible Parts*: *Contrariwise*, *Tough Bodies* haue more *Spirit*, and fewer *Pores*, and *Moister Tangible Parts*: Therefore wee see that *Parchment*, or *Leather* will stretch, *Paper* will not; *Woollen Cloth* will tenter, *Linnen* scarcely.

All

ALL *Solid Bodies* consist of *Parts* of two seuerall *Natures*; *Pneumaticall*, and *Tangible*; And it is well to be noted, that the *Pneumaticall Substance* is in some *Bodies*, the *Native Spirit* of the *Body*; And in some other, plaine *Aire* that is gotten in; As in *Bodies Deficcate*, by *Heat*, or *Age*: For in them, when the *Native Spirit* goeth forth, and the *Moisture* with it, the *Aire* with time getteth into the *Pores*. And those *Bodies* are euer the more *Fragile*; For the *Native Spirit* is more *Yeelding*, and *Extensiue*, (especially to follow the *Parts*,) than *Aire*. The *Native Spirits* also admit great Diuersity; As *Hot*, *Cold*, *Actiue*, *Dull*, &c. Whence proceed most of the *Vertues*, and *Qualities* (as wee call them) of *Bodies*: But the *Aire Intermixt*, is without *Vertues*, and maketh Things *Insipide*, and without any *Extimulation*.

Experiment Solitary touching the *Two Kinds* of *Pneumaticals* in *Bodies*. 842

THE *Concretion* of *Bodies* is (commonly) solued by the *Contrary*; As *Ice*, which is congealed by *Cold*, is dissolued by *Heat*; *Salt*, and *Sugar*, which are Excocted by *Heat*, are Dissolued by *Cold*, and *Moisture*. The *Cause* is, for that these *Operations*, are rather *Returnes* to their former *Nature*, than *Alterations*: So that the *Contrary* cureth. As for *Oyle*, it doth neither easily congeale with *Cold*, nor thicken with *Heat*. The *Cause* of both *Effects*, though they be produced by Contrary *Efficients*, seemeth to be the Same; And that is, because the *Spirit* of the *Oyle*, by either Meanes, exhaleth little; For the *Cold* keepeth it in; and the *Heat*, (except it be Vehement,) doth not call it forth. As for *Cold*, though it take hold of the *Tangible Parts*, yet as to the *Spirits*, it doth rather make them Swell, than Congeale them: As when *Ice* is congealed in a *Cup*, the *Ice* will Swell in stead of Contracting; And sometimes Rift.

Experiment Solitary touching *Concretion*, and *Dissolution* of *Bodies*. 843

OF *Bodies*, some (we see) are *Hard*, and some *Soft*: The *Hardnesse* is caused (chiefly) by the *Leuenesse* of the *Spirits*; And their *Imparity* with the *Tangible Parts*: Both which, if they be in a greater degree, maketh them not only *Hard*, but *Fragile*, and lesse Enduring of *Pressure*; As *Steele*, *Stone*, *Glasse*, *Dry Wood*, &c. *Softnesse* commeth (contrariwise) by the Greater *Quantity* of *Spirits*; (which euer helpeth to Induce *Yeelding* and *Cession*;) And by the more *Equall Spreading* of the *Tangible Parts*, which thereby are more *Sliding*, and *Following*; As in *Gold*, *Lead*, *Wax*, &c. But note that *Soft Bodies*, (as wee vse the word,) are of two *Kinds*; The one, that easily giueth place to another *Body*, but altereth not *Bulke*, by Rising in other *Places*; And therefore we see that *Wax*, if you put any Thing into it, doth not rise in *Bulke*, but only giueth Place: For you may not thinke, that in *Printing* of *Wax*, the *Wax* riseth vp at all; But only the *depressed Part* giueth place, and the other remaineth as it was. The other, that altereth *Bulke* in the *Cession*; As *Water*, or other *Liquours*, if you put a *Stone*, or any Thing into them, they giue place (indeed) easily, but then they rise all ouer: Which is a False *Cession*; For it is in *Place* and not in *Body*.

Experiment Solitary touching *Hard* and *Soft Bodies*. 844

Experiment Solitary touching *Bodies Ductile*, and *Tensile*. 845

ALL *Bodies Ductile*, and *Tensile*, (as *Metals* that will be drawne into *Wires*; *Wooll* and *Tow* that will be drawne into *Yarne*, or *Thred*) haue in them the *Appetite* of *Not Discontinuing*, Strong; Which maketh them follow the Force, that pulleth them out; And yet so, as not to *Discontinue* or forsake their owne *Body*. *Viscous Bodies*, (likewise) as *Pitch*, *Wax*, *Bird-Lime*, *Cheese toasted*, will draw forth, and rope. But the difference betweene *Bodies Fibrous*, and *Bodies Viscous*, is Plaine; For all *Wooll*, and *Tow*, and *Cotton*, and *Silke*, (especially raw *Silke*) haue, besides their Desire of *Continuance*, in regard of the *Tenuity* of their *Thred*, a *Greedinesse* of *Moisture*; And by *Moisture* to ioyne and incorporate with other *Thred*; Especially if there be a little *Wreathing*; As appeareth by the *Twisting* of *Thred*; And the Practice of *Twirling* about of *Spindles*. And we see also, that *Gold* and *Silver Thred* cannot bee made without *Twisting*.

Experiment Solitary touching other *Passions* of *Matter*, and *Characters* of *Bodies*. 846

THe *Differences* of *Impressible* and *Not Impressible*; *Figurable* and *Not Figurable*; *Mouldable* and *Not Mouldable*; *Scissile* and *Not Scissile*; And many other *Pasions* of *Matter*, are *Plebeian Notions*, applied vnto the *Instruments* and *Vses* which Men ordinarily practise; But they are all but the *Effects* of some of these *Causes* following; Which we will Enumerate without Applying them, because that would bee too long. The First is the *Cession*, or not *Cession* of *Bodies*, into a *Smaller Space* or *Roome*, keeping the Outward *Bulke*, and not flying vp. The Second is the *Stronger* or *Weaker Appetite*, in *Bodies*, to *Continuity*, and to flie *Discontinuitie*. The Third is the *Disposition* of *Bodies*, to *Contract*, or *Not Contract*; And againe, to *Extend*, or *Not Extend*. The Fourth is the *Small Quantity*, or *Great Quantity*, of the *Pneumaticall* in *Bodies*. The Fifth is the *Nature* of the *Pneumaticall*, whether it bee *Natiue Spirit* of the *Body*, or *Common Aire*. The Sixth is, the *Nature* of the *Natiue Spirits* in the *Body*, whether they be *Active* and *Eager*, or *Dull* and *Gentle*. The Seuenth is the *Emission* or *Detention* of the *Spirits* in *Bodies*. the Eighth is the *Dilatation*, or *Contraction* of the *Spirits* in *Bodies*, while they are detained. The Ninth is the *Collocation* of the *Spirits* in *Bodies*; whether the *Collocation* be *Equall*, or *Vnequall*; And againe, whether the *Spirits* be *Coacervate*, or *Diffused*. The Tenth is the *Densitie*, or *Raritie* of the *Tangible Parts*. The Eleuenth is the *Equality* or *Inequality* of the *Tangible Parts*. The Twelfth is the *Digestion*, or *Crudity* of the *Tangible Parts*. The Thirteenth is the *Nature* of the *Matter*, whether *Sulphureous* or *Mercuriall*, *Watrie* or *Oilie*, *Drie* and *Terrestriall*, or *Moist* and *Liquid*; which *Natures* of *Sulphureous* and *Mercuriall*, seeme to bee *Natures Radicall*, and *Principall*. The Fourteenth is the *Placing*, of the *Tangible Parts*, in *Length*, or *Transuerse*; (as it is in the *Warpe*, and the *Woofe* of *Textiles*;) *More Inward*, or *More Outward*; &c. The Fifteenth is the *Porosity*, or *Imporosity* betwixt the *Tangible Parts*; And the *Greatnesse*, or *Smalnesse* of the *Pores*. The Sixteenth is the *Collocation* and *Posture* of the *Pores*. There may be more *Causes*; but these doe occurre for the Present.

Take

TAke *Lead*, and melt it, and in the middeſt of it, when it beginneth to congeale, make a little Dint, or Hole, and put *Quicke-ſiluer* wrapped in a Peece of *Linnen* into that Hole, and the *Quick-ſiluer* will fix; and runne no more, and endure the Hammer. This is a Noble *Inſtance* of *Induration*, by *Conſent* of one *Body* with another, and *Motion* of *Excitation* to *Imitate*; For to aſcribe it only to the *Vapour* of *Lead*, is leſſe Probable. *Quære* whether the *Fixing* may be in ſuch a degree, as it will be Figured like other *Metalls*? For if ſo, you may make Workes of it for ſome purpoſes, ſo they come not neare the *Fire*.

Experiment Solitary touching *Induration* by *Sympathy*. 847

SVgar hath put downe the vſe of *Honey*; In ſo much as wee haue loſt thoſe *Obſeruations*, and *Preparations* of *Honey*, which the *Ancients* had, when it was more in Price. Firſt, it ſeemeth that there was, in old time, *Tree-Honey*, as well as *Bee-Honey*; Which was the *Teare* or *Blond* iſſuing from the *Tree:* In ſo much as one of the *Ancients* relateth, that in *Trebiſond*, there was *Honey* iſſuing from the *Box-Trees*, which made *Men* Mad. Againe, in Ancient time, there was a Kind of *Honey*, which either of the owne Nature, or by Art, would grow as Hard as *Sugar*, And was not ſo Luſhious as Ours. They had alſo a *Wine* of *Honey*, which they made thus. They cruſhed the *Honey* into a great *Quantitie of Water*, and then ſtrained the *Liquor*; After they boyled it in a Copper to the halfe: Then they powred it into *Earthen Veſſels*, for a ſmall time; And after tunned it into *Veſſels* of *Wood*, and kept it for many yeares. They haue alſo, at this day, in *Ruſſia*, and thoſe *Notherne Countries*, *Mead Simple*, which (well made, and ſeaſoned) is a good wholeſome *Drink*, and very Cleare. They vſe alſo in *Wales*, a Compound *Drinke* of *Mead*, with *Herbs*, and *Spices*. But meane-while it were good, in recompence of that wee haue loſt in *Honey*, there were brought in vſe a *Sugar-Mead*, (for ſo we may call it,) though without any *Mixture* at all of *Honey*; And to brew it, and keepe it ſtale, as they vſe *Mead*; For certainly, though it would not be ſo *Abſterſiue*, and *Opening*, and *Solutiue* a *Drinke*, as *Mead*; yet it will be more gratefull to the *Stomach*, and more *Lenitiue*, and fit to be vſed in *Sharpe Diſeaſes*: For we ſee, that the vſe of *Sugar* in *Beere*, and *Ale*, hath good *Effects* in ſuch Caſes.

Experiment Solitary touching *Honey* and *Sugar*. 848

IT is reported by the *Ancients*, that there was a Kind of *Steele*, in ſome places, which would poliſh almoſt as white and bright as *Siluer*. And that there was in *India* a Kind of *Braſſe*, which (being poliſhed) could ſcarce be diſcerned from *Gold*. This was in the *Naturall Vre*; But I am doubtfull, whether Men haue ſufficiently refined *Metalls*, which wee count *Baſe*: As whether *Iron*, *Braſſe*, and *Tin*, be refined to the Heighth? But when they come to ſuch a Fineneſſe, as ſerueth the ordinary vſe, they trie no further.

Experiment Solitary touching the *Finer Sort* of *Baſe Metalls*. 849

THere haue beene found certaine *Cements* vnder *Earth*, that are very Soft; And yet, taken forth into the *Sun*, harden as Hard as *Marble*: There

Experiment Solitary touching *Cements* and *Quarries*. 850

There are alſo ordinary *Quarries* in *Sommerſit-Shire*, which in the *Quarry* cut ſoft to any Bigneſſe, and in the *Building* proue firme, and hard.

Experiment Solitary touching the *Altering* of the *Colour* of *Heires* and *Feathers*. 851

Liuing Creatures (generally) doe change their *Haire* with *Age*, turning to be *Gray* and *White*: As is ſeene in *Men*, though ſome Earlier, ſome Later,; In *Horſes*, that are Dappled, and turne *White*; In *Old Squirrels*, that turne *Griſly*; And many others. So doe ſome *Birds*; As *Cygnets*, from *Gray* turne *White*; *Hawkes*, from *Browne* turne more *White*: And ſome *Birds* there be, that vpon their *Moulting*, doe turne *Colour*; As *Robin Red-breſts*, after their *Moulting*, grow to be *Red* againe, by degrees; So doe *Gold-Finches* vpon the *Head*. The cauſe is, for that *Moiſture* doth (chiefly) colour *Haire*, and *Feathers*; And *Drineſſe* turneth them *Gray* and *White*; Now *Haire* in *Age* waxeth *Drier*: So doe *Feathers*. As for *Feathers*, after *Moulting*, they are *Young Feathers*, and ſo all one as the *Feathers* of *Young Birds*. So the *Beard* is younger than the *Haire* of the *Head*, and doth (for the moſt part,) wax *Hoare* later. Out of this Ground, a *Man* may deuiſe the *Meanes* of *Altering* the *Colour* of *Birds*; and the *Retardation* of *Hoare-Haires*. But of this ſee in the fifth *Experiment*.

Experiment Solitary touching the *Differences* of *Liuing Creatures*, *Male* and *Female*. 852

The *Difference* between *Male* and *Female*, in ſome *Creatures*, is not to be diſcerned, otherwiſe than in the *Parts* of *Generation*: As in *Horſes* and *Mares*, *Dogges* and *Bitches*, *Doues He* and *She*, and others. But ſome differ in *Magnitude*, and that diuerſly; For in moſt the *Male* is the greater; As in *Man*, *Pheaſants*, *Peacocks*, *Turkey's*; and the like; And in ſome few, as in *Hawkes*, the *Female*. Some differ in the *Haire*; and *Feathers*, both in the *Quantity*, *Criſpation*, and *Colours* of them; As *He-Lions* are *Herſute*, and haue great *Maines*; The *She's* are ſmooth like *Cats*. *Bulls* are more *Criſpe* vpon the *Fore-head* than *Cowes*; The *Peacocke*, and *Pheaſant-Cocke*, and *Gold-finch-Cocke*, haue glorious and fine *Colours*; The *Henn's* haue not. Generally, the Hees in *Birds* haue the faireſt *Feathers*. Some differ in diuers *Features*; As *Buckes* haue *Hornes*, *Doe's* none; *Rammes* haue more *wreathed Hornes* than *Ewes*; *Cocks* haue great *Combes* and *Spurres*, *Hens* little or none; *Boares* haue great *Fangs*, *Sowes* much leſſe; The *Turky-Cocke* hath great and Swelling *Gills*, the *Hen* hath leſſe; *Men* haue generally Deeper and Stronger *Voices*, than *Women*. Some differ in *Facultie*; As the *Cockes* amongſt *Singing Birds*, are the beſt *Singers*. The Chiefe *Cauſe* of all theſe, (no doubt,) is, for that the *Males* haue more Strength of *Heat* than the *Females*; Which appeareth manifeſtly in this, that all young *Creatures Males*, are like *Females*; And ſo are *Eunuchs*, and *Gelt Creatures* of all kindes, liker *Females*. Now *Heat* cauſeth *Greatneſſe* of *Growth*, generally, where there is *Moiſture* enough to worke vpon: But if there be found in any *Creature*, (which is ſeene rarely,) an Ouer-great *Heat* in proportion to the *Moiſture*, in them the *Female* is the greater; As in *Hawkes*, and *Sparrowes*. And if the *Heat* be ballanced with the *Moiſture*, then there is no difference to be ſeene betweene *Male* and *Female*.

male: As in the *Instances* of *Horses*, and *Dogges*. We see also, that the *Hornes*: of *Oxen*, and *Cowes*, for the most part, are Larger than the *Bulls*; which is caused by abundance of *Moisture*, which in the *Hornes* of the *Bull* faileth. Againe, *Heat* causeth *Pilosity*, and *Crispation*; And so likewise *Beards* in *Men*. It also expelleth finer *Moisture*, which Want of *Heat* cannot Expell: And that is the *Cause* of the *Beauty* and *Variety* of *Feathers*: Againe, *Heat* doth put forth many *Excrescenses*, and much Solide *Matter*, which Want of *Heat* cannot do: And this is the *Cause* of *Hornes*, and of the *Greatnesse* of them; And of the *Greatnesse* of the *Combes* and *Spurres* of *Cockes*, *Gills* of *Turky-Cockes*, and *Fangs* of *Boares*. *Heat* also dilateth the *Pipes*, and *Organs*, which causeth the *Deepenesse* of the *Voice*. Againe, *Heat* refineth the *Spirits*, and that causeth the *Cock-Singing Bird*, to Excell the *Hen*.

THere be *Fishes* greater than any *Beasts*; As the *Whale* is farre greater than the *Elephant*. And *Beasts* are (generally) greater than *Birds*, For *Fishes*, the cause may be, that because they Liue not in the *Aire*, they haue not their *Moisture* drawn and Soaked by the *Aire*, and *Sun-Beames*. Also they rest alwayes, in a manner; and are supported by the *Water*; whereas *Motion* and *Labour* doe consume. As for the *Greatnesse* of *Beasts*, more than of *Birds*, it is caused; for that *Beasts*, stay Longer time in the *Wombe*; than *Birds*; and there Nourish, and Grow; Whereas in *Birds*, after the *Egge* Lay'd, there is no further *Growth*, or *Nourishment* from the *Female*: For the *Siting* doth *Vinifie*, and not Nourish.

Experiment Solitary touching the *Comparative Magnitude* of *Liuing Creatures*. 853

WE haue partly touched before the *Meanes* of *Producing Fruits*, without *Coares*, or *Stones*. And this wee adde further, that the *Cause* must be *Aboundance* of *Moisture*; For that the *Coare*, and *Stone* are made of a *Drie Sap*: And wee see that it is possible to make a *Tree* put forth only in *Blossome*, without *Fruit*; As in *Cherries* with *Double Flowers*; Much more into *Fruit* without *Stone*, or *Coares*. It is reported, that a *Cions* of an *Apple*, grafted vpon a *Colewort-Stalk*, sendeth forth a great *Apple* without a *Coare*. It is not vnlikely; that if the *Inward Pith* of a *Tree*, were taken out, so that the Iuyce came only by the *Barke*, it would work the *Effect*. For it hath beene obserued, that in *Pollards*, if the *Water* get in on the *Top*, and they become Hollow, they put forth the more. We adde also, that it is deliuered for certaine by some, that if the *Cions* be grafted, the Small End downwards, it will make *Fruit* haue little or no Coares, and *Stones*.

Experiment Solitary touching *Exossation* of *Fruits*. 854

TObacco is a thing of great Price, if it be in request. For an *Acre* of it will be worth, (as is affirmed,) two Hundred Pounds, by the yeare, towards Charge. The Charge of making the Ground; and otherwise, is great, but nothing to the Profit. But the *English Tabacco*, hath small credit; as being too *Dull*, and *Earthy*: Nay the *Virginian Tobacco*, though that be in a *Hotter Climate*, can get no credit, for the same *Cause*: So that a Triall

Experiment Solitary touching the *Melioration* of *Tobacco*. 855

a Triall to make *Tobacco* more *Aromaticall*, and better Concocted here in *England*, were a Thing of great profit. Some haue gone about to doe it by Drenching the *Engliſh Tobacco*, in a *Decoction* or *Infuſion* of *Indian Tobacco*: But thoſe are but Sophiſtications, and Toyes; For Nothing that is once Perfect, and hath run his Race, can receiue much Amendment. You muſt euer reſort to the Beginning of Things for *Melioration*. The Way of *Maturation* of *Tobacco* muſt, as in other *Plants*, be, from the *Heat*. Either of the *Earth*, or of the *Sunne*: We ſee ſome Leading of this in Musk-Melons; which are ſowne vpon a *Hot Bed*, Dunged below, vpon a Bancke turned vpon the *South Sunne*, to giue *Heat* by *Reflexion*; Laid vpon *Tiles*, which increaſeth the *Heat*; And couered with *Straw* to keepe them from *Cold*. They remoue them alſo, which addeth ſome *Life*: And by theſe Helps they become as good in *Englaud*, as in *Italy*, or *Prouence*. Theſe and the like Meanes, may be tried in *Tobacco*. Enquire alſo of the *Steeping* of the *Roots*, in ſome ſuch *Liquor*, as may giue them Vigour to put forth Strong.

Experiment Solitary touching ſeuerall *Heats*, working the ſame *Effects*. 856

HEat of the *Sun*, for the *Maturation* of *Fruits*; Yea and the *Heat* of *Vinification* of *Liuing Creatures*, are both repreſented and ſupplied, by the *Heat* of *Fire*; And likewiſe, the *Heats* of the *Sunne*, and *Life*, are repreſented one by the other. *Trees*, ſet vpon the *Backs* of *Chimneyes*, doe ripen *Fruit* ſooner. *Vines*, that haue beene drawne in at the Window of a *Kitchin*, haue ſent forth *Grapes* ripe a Month (at leaſt) before others. *Stoues*, at the Backe of Walls, bring forth *Orenges* here with vs. *Eggs*, as is reported by ſome, haue beene hatched in the warmth of an *Ouen*. It is reported by the *Ancients*, that the *Eſtrich* Layeth her *Egs* vnder *Sand*, where the *Heat* of the *Sunne* diſcloſeth them.

Experiment Solitary touching *Swelling* and *Dilatation* in *Boyling*. 857

BArley in the *Boyling* ſwelleth not much; *Wheat* ſwelleth more; *Rize* extremely; In ſo much as a Quarter of a Pint (vnboyled) will ariſe to a Pint boiled. The *Cauſe* (no doubt) is, for that the more Cloſe and Compact the *Body* is, the more it will dilate: Now *Barley* is the moſt Hollow; *Wheat* more Solide than that; and *Rize* moſt Solide of all. It may be alſo that ſome *Bodies* haue a Kinde of *Lentour*, and more *Deperdible Nature* than others; As we ſee it euident in *Colouration*; For a Small *Quantity* of *Saffron*, will Tint more, than a very great *Quantity* of *Breſill*, or *Wine*.

Experiment Solitary touching the *Dulceration* of *Fruits*. 858

FRuit groweth *Sweet* by *Rowling*, or *Preſſing* them gently with the *Hand*; As *Rowling-Peares*, *Damaſins*, &c. By *Rottenneſſe*; As *Medlars*, *Seruices*, *Sloe's*, *Heps*, &c. By *Time*; As *Apples*, *Wardens*, *Pomgranats*, &c. By certaine Speciall *Maturations*; As by *Laying* them in *Hay*, *Straw*, &c. And by *Fire*; As in *Roaſting*, *Stewing*, *Baking*, &c. The *Cauſe* of the *Sweetneſſe* by *Rowling*, and *Preſſing*, is *Emollition*, which they properly enduce; As in Beating of *Stock-Fiſh*, *Fleſh*, &c. By *Rottenneſſe* is, for that the *Spirits* of the *Fruit*, by *Putrefaction*, gather *Heat*, and thereby diſgeſt the

the Harder Part; For in all *Putrifactions*, there is a *Degree* of *Heat*. By *Time* and *Keeping* is, because the *Spirits* of the *Body*, doe euer feed vpon the *Tangible Parts*, and attenuate them. By seuerall *Maturations* is, by some *Degree* of *Heat*. And by *Fire* is, because it is the proper Work of *Heat* to Refine, and to Incorporate; And all *Soureneſſe* consisteth in some *Groſſneſſe* of the *Body*: And all *Incorporation* doth make the *Mixture* of the *Body*, more *Equall*, in all the *Parts*; Which euer induceth a Milder *Taſte*.

OF *Fleſhes*, some are *Edible*; Some, except it be in *Famine*, not. For those that are not *Edible*, the *Cauſe* is, for that they haue (commonly) too much *Bitterneſſe* of *Taſte*; And therefore those *Creatures*, which are Fierce and Cholericke, are not *Edible*; As *Lions*, *Wolues*, *Squirrells*, *Dogs*, *Foxes*, *Horſes*, &c. As for *Kine*, *Sheepe*, *Goats*, *Deere*, *Swine*, *Conneyes*, *Hares*, &c. We see they are *Milde*, and *Fearefull*. Yet it is true, that *Horſes*, which are *Beaſts* of Courage, haue beene, and are eaten by some *Nations*; As the *Scythians* were called *Hippophagi*; And the *Chineſes* eat *Horſe-fleſh* at this day; And some *Gluttons* haue vſed to haue *Colts-fleſh* baked. In *Birds*, such as are *Carniuoræ*, and *Birds* of *Prey*, are commonly no Good *Meat*; But the Reason is, rather the *Cholericke Nature* of those *Birds*, than their *Feeding* vpon *Fleſh*; For *Puits*, *Gulls*, *Shouelers*, *Ducks*, doe feed vpon *Fleſh*, and yet are Good *Meat*: And we see, that those *Birds*, which are of *Prey*, or feed vpon *Fleſh*, are good *Meat*, when they are very Young; As *Hawkes*, *Rookes* out of the Neaſt, *Owles*, &c. *Mans Fleſh* is not Eaten. The Reasons are Three: Firſt, because *Men* in *Humanity* doe abhorre it: Secondly, because no *Liuing Creature*, that *Dyeth* of *it ſelfe*, is good to Eat: And therefore the *Caniballs* (themselues) eat no *Mans-fleſh*, of those that *Dye* of *Themſelues*, but of such as are *Slaine*. The Third is, because there must be (generally) some *Diſparity*, between the *Nouriſhment*, and the *Body Nouriſhed*; And they must not be Ouer-neere, or like: Yet we see, that in great *Weakeneſſes*, and *Conſumptions*, *Men* haue beene sustained with *Womans Milke*: And *Ficinus* fondly (as I conceiue) aduiseth, for the *Prolongation* of *Life*, that a *Veine* be opened in the *Arme* of some wholesome *Young Man*; And the *Bloud* to be sucked. It is said, that *Witches* doe greedily eat *Mans-fleſh*; which If it be true, besides a *Diuelliſh Appetite* in them, it is likely to proceed, for that *Mans-fleſh* may send vp high and Pleasing *Vapours*, which may stirre the *Imagination*; And *Witches* Felicity is chiefly in *Imagination*, as hath beene said.

Experiment Solitary touching *Fleſh Edible*, and not *Edible*. 859

THere is an Ancient Receiued *Tradition* of the *Salamander*, that it liueth in the *Fire*, and hath force also to extinguish the *Fire*. It must haue two Things, if it be true, to this *Operation*: The One a very *Cloſe Skin*, whereby *Flame* which in the Midſt is not so hot, cannot enter: For wee see that if the *Palme* of the *Hand* be anointed thicke with *White* of *Egge*, and then *Aquauitæ* be powred vpon it, and Enflamed, yet one may endure the *Flame* a pretty while. The other is some *Extreme Cold* and

Experiment Solitary touching the *Salamander*. 860

Quenching

Quenching vertue, in the *Body* of that *Creature*, which choaketh the *Fire*. Wee see that *Milke* quencheth *wild-fire*, better than *water*, because it entreth better.

Experiment Solitary touching the *Contrary Operations of Time*, vpon *Fruits* and *Liquors*. 861

Time doth change *Fruit*, (as *Apples*, *Peares*, *Pomgranates*, &c.) from more *Sowre*, to more *Sweet*: But contrariwise *Liquors* (euen those that are of the *Iuyce* of *Fruit*) from more *Sweet* to more *Sowre*; As *Wort*, *Must*, *New Veriuyce*, &c. The *Cause* is, the *Congregation* of the *Spirits* together: For in both Kindes, the *Spirits* is attenuated by *Time*; But in the first Kinde, it is more *Diffused*, and more *Mastered* by the *Grosser Parts*, which the *Spirits* doe but digest: But in *Drinks* the *Spirits* doe reigne, and finding lesse Opposition of the *Parts*, become themselues more *Strong*; Which causeth also more Strength in the *Liquor*; Such, as if the *Spirits* be of the Hotter Sort, the *Liquor* becommeth apt to *Burne*; But in Time, it causeth likewise, when the Higher *Spirits* are Enaporated, more *Sowrenesse*.

Experiment Solitary touching *Blowes* and *Bruises*. 862

It hath beene obserued by the *Ancients*, that *Plates* of *Metall*, and especially of *Brasse*, applyed presently to a *Blow*, will keepe it downe from *Swelling*. The *Cause* is *Repercussion*, without *Humectation*, or *Entrance* of any *Body*: for the *Plate* hath only a *Virtuall Cold*, which doth not search into the *Hurt*; Whereas all *Plasters*, and *Ointments* do enter. Surely, the *Cause*, that *Blowes* and *Bruises* enduce *Swellings*, is, for that the *Spirit* resorting to Succour the *Part* that Laboureth, draw also the *Humours* with them: For we see, that it is not the *Repulse*, and the *Returne* of the *Humour* in the *Part Strucken*, that causeth it; For That *Gouts*, and *Tooth-Aches* cause swelling, where there is no *Percussion* at all.

Experiment Solitary touching the *Orris Root*. 863

The *Nature* of the *Orris Root*, is almost Singular; For there be few *Odoriferous Roots*; And in those that are, in any degree, *Sweet*, it is but the same *Sweetnesse* with the *Wood*, or *Leafe*: But the *Orris* is not *Sweet* in the *Leafe*; Neither is the *Flower* any thing so *Sweet* as the *Root*. The *Root* seemeth to haue a Tender dainty *Heat*; Which when it commeth aboue Ground, to the *Sunne*, and the *Aire*, vanisheth: For it is a great *Mollifier*; And hath a Smell like a *Violet*.

Experiment Solitary touching the *Compression* of *Liquors*. 864

It hath beene obserued by the *Ancients*, that a great *vessel* full, drawne into *Bottles*; And then the *Liquor* put againe into the *Vessell*, will not fill the *Vessell* againe, so full as it was, but that it may take in more *Liquor*: And that this holdeth more in *Wine*, than in *water*. The *Cause* may be Triuiall; Namely, by the *Expence* of the *Liquor*, in regard some may sticke to the Sides of the *Bottles*: But there may be a *Cause* more Subtill; Which is, that the *Liquor* in the *Vessell*, is not so much *Compressed*, as in the *Bottle*; Because in the *Vessell*, the *Liquor* meeteth with *Liquor* chiefly; But in the *Bottles* a Small Quantity of *Liquor*, meeteth

teth with the Sides of the *Bottles*, which Compresse it so, that it doth not Open it againe.

Water, being contiguous with *Aire*, Cooleth it, but Moisteneth it not, except it *Vapour*. The *Cause* is, for that *Heat*, and *Cold* haue a *Virtuall Transition*, without *Communication* of *Substance*; but *Moisture* not: And to all *Madefaction* there is required an *Imbibition*: But where the *Bodies* are of such seuerall Leuity, and Grauity, as they Mingle not, there can follow no *Imbibition*. And therefore, *Oyle* likewise lyeth at the *Top* of the *Water*, without Commixture: And a *Drop* of *Water*, running swiftly ouer a *Straw*, or *Smooth Body*, wetteth not.

Experiment Solitary, touching the *Working* of *Water* vpon *Aire Contiguous*. 865

Starr-Light Nights, yea, and bright *Moone-shine Nights*, are *Colder* than *Cloudy Nights*. The *Cause* is, the *Drineſſe* and *Fineneſſe* of the *Aire*, which thereby becommeth more *Piercing*, and *Sharpe*: And therefore *Great Continents* are colder than *Islands*: And as for the *Moone*, though it selfe inclineth the *Aire* to *Moisture*, yet when it shineth bright, it argueth the *Aire* is dry. Also *Close Aire*, is warmer than *Open Aire*; which (it may be) is, for that the true *Cause* of *Cold*, is an *Expiration* from the *Globe* of the *Earth*, which in open *Places* is stronger; And againe, *Aire* it selfe, if it bee not altered by that *Expiration*, is not without some Secret *Degree* of *Heat*: As it is not likewise without some Secret *Degree* of *Light*: For otherwise *Cats*, and *Owles*, could not see in the *Night*; But that *Aire* hath a little *Light*, Proportionable to the *Visuall Spirits* of those *Creatures*.

Experiment Solitary touching the *Nature* of *Aire*. 866

THe *Eyes* doe moue one and the same way; For when one *Eye* moueth to the *Nosthrill*, the other moueth from the *Nosthrill*. The *Cause* is *Motion* of *Consent*, which in the *Spirits*, and *Parts Spirituall*, is Strong. But yet *Vse* will induce the Contrary: For some can *Squint*, when they will: And the Common *Tradition* is, that if *Children* be set vpon a Table, with a Candle behind them, both *Eyes* will moue Outwards; As affecting to see the light, and so induce *Squinting*.

Experiments in Consort touching the *Eyes*, and *Sight*. 867

Wee see more exquisitely with one *Eye Shut*, than with *Both Open*. The *Cause* is, for that the *Spirits Visuall* vnite themselues more, and so become Stronger. For you may see by looking in a *Glasse*, that when you shut one *Eye*, the *Pupill* of the other *Eye*, that is Open, Dilateth. 868

The *Eyes*, if the *Sight* meet not in one *Angle*, *See Things Double*. The *Cause* is, for that *Seeing* Two Things, and *Seeing* one Thing twice, worketh the same *Effect*: And therefore a little *Pellet*, held betweene two *Fingers* laid a-crosse, seemeth *Double*. 869

Pore-blinde Men, see best in the *Dimmer Lights*; And likewise haue their *Sight* Stronger neere hand, than those that are not *Pore-blinde*; And can Reade and Write smaller *Letters*. The *Cause* is, for that the *Spirits Visuall*, in those that are *Pore-blinde*, are Thinner and Rarer, than in others; And therefore the Greater *Light* disperseth them. For the same 870

Cauſe they need Contracting; But being *Contracted*, are more ſtrong, than the *Viſuall Spirits* of Ordinary *Eyes* are; As when we ſee thorow a *Leuell*, the *Sight* is the Stronger: And ſo is it, when you gather the *Eye-lids* ſomewhat cloſe: And it is commonly ſeene in thoſe that are *Pore-blinde*, that they doe much gather the *Eye-lids* together. But *Old Men*, when they would ſee to Reade, put the Paper ſomewhat afarre off. The *Cauſe* is, for that *Old Mens Spirits Viſuall*, contrary to thoſe of *Pore-blinde Men*, vnite not, but when the *Obiect* is at ſome good diſtance, from their *Eyes*.

871 *Men* ſee better, when their *Eyes* are ouer-againſt the *Sunne*, or a *Candle*, if they put their *Hand* a little before their *Eye*. The *Reaſon* is, for that the *Glaring* of the *Sunne*, or the *Candle* doth weaken the *Eye*; whereas the *Light Circumfuſed* is enough for the *Perception*. For we ſee, that an *Ouer-light* maketh the *Eyes* Dazell; Inſomuch as Perpetuall Looking againſt the *Sunne*, would Cauſe *Blindneſſe*. Againe, if *Men* come out of a *Great Light*, into a *Darke Roome*; And contrariwiſe, if they come out of a *Darke Roome*, into a *Light Roome*, they ſeeme to haue a *Miſt* before their *Eyes*, and ſee worſe than they ſhall doe, after they haue ſtayed a little while, either in the *Light*, or in the *Darke*. The *Cauſe* is, for that the *Spirits Viſuall*, are vpon a Sudden Change diſturbed, and put out of Order; And till they be recollected, doe not performe their Function well. For when they are much *Dilated* by *Light*, they cannot contract ſuddenly; And when they are much *Contracted* by *Darkneſſe*, they cannot *Dilate* ſuddenly. And Exceſſe of both theſe (that is, of the *Dilatation*, and *Contraction* of the *Spirits Viſuall*,) if it be long, Deſtroyeth the *Eye*. For as long Looking againſt the *Sun*, or *Fire*, hurteth the *Eye*, by *Dilatation*; So *Curious Painting* in *Small Volumes*, and *Reading* of *Small Letters*, doe hurt the *Eye* by *Contraction*.

872 It hath beene obſerued, that in *Anger*, the *Eyes* wax *Red*; And in *Bluſhing*, not the *Eyes*, but the *Eares*, and the *Parts* behinde them. The *Cauſe* is, for that in *Anger*, the *Spirits* aſcend and wax Eager; Which is moſt eaſily ſeene in the *Eyes*, becauſe they are Tranſlucide; Though withall it maketh both the *Cheekes*, and the *Gills Red*; But in *Bluſhing*, it is true, the *Spirits* aſcend likewiſe to Succour, both the *Eyes* and the *Face*, which are the *Parts* that labour: But then they are repulſed by the *Eyes*, for that the *Eyes*, in Shame doe put backe the *Spirits* that aſcend to them, as vnwilling to looke abroad: For no *Man*, in that *Paſſion*, doth looke ſtrongly, but Deiectedly; And that *Repulſion* from the *Eyes*, Diuerteth the *Spirits* and *Heat* more to the *Eares*, and the *Parts* by them.

873 The *Obiects* of the *Sight*, may cauſe a great *Pleaſure* and *Delight* in the *Spirits*, but no *Paine*, or great *Offence*; Except it be by *Memory*, as hath beene ſaid. The *Glimſes* and *Beames* of *Diamonds* that ſtrike the *Eye*; *Indian Feathers*, that haue glorious Colours; The *Comming* into a *Faire Garden*; The *Comming* into a *Faire Roome* richly furniſhed; A *Beautifull* Perſon; And the like; doe delight and exhilarate the *Spirits* much. The *Reaſon*,

Reason, why it holdeth not in the *Offence*, is, for that the *Sight* is the most *Spirituall* of the *Senses*; whereby it hath no *Obiect* Grosse enough to offend it. But the *Cause* (chiefly) is, for that there be no *Actiue Obiects* to offend the *Eye*. For *Harmonicall Sounds*, and *Discordant Sounds*, are both *Actiue*, and *Positiue*: So are *Sweet Smels*, and *Stinkes*: So are *Bitter*, and *Sweet*, in *Tastes*: So are *Ouer-Hot*, and *Ouer-Cold*, in *Touch*: But *Blacknesse*, and *Darknesse*, are indeed but *Priuatiues*; And therefore haue little or no *Actiuity*. Somewhat they doe Contristate, but very little.

Experiment Solitary touching the *Colour* of the *Sea*, or other *Water*. 874

Water of the *Sea*, or otherwise, looketh *Blacker* when it is moued, and *whiter* when it resteth. The *Cause* is, for that by meanes of the *Motion*, the *Beames* of light passe not *Straight*, and therefore must be darkned: whereas, when it resteth, the *Beames* doe passe Straight. Besides, *Splendour* hath a *Degree* of *Whitenesse*; Especially if there be a little *Repercussion*: For a *Looking-Glasse* with the *Steele* behinde, looketh *whiter* than *Glasse Simple*. This *Experiment* deserueth to be driuen further, in Trying by what meanes *Motion* may hinder *Sight*.

Experiment Solitary touching *Shell-Fish*. 875

Shell-Fish haue beene, by some of the *Ancients*, compared and sorted with the *Insecta*; But I see no reason why they should; For they haue *Male*, and *Female*, as other *Fish* haue: Neither are they bred of *Putrifaction*; Especially such as doe Moue. Neuertheless, it is certaine, that *Oysters*, and *Cockles*, and *Muscles*, which Moue not, haue no discriminate *Sex*: *Quere* in what time, and how they are bred? It seemeth that *Shels* of *Oysters* are bred where none were before; And it is tried, that the great *Horse-Muscle*, with the fine shell, that breedeth in *Ponds*, hath bred within thirty yeares: But then, which is strange, it hath beene tried, that they doe not onely Gape, and Shut, as the *Oysters* doe, but Remoue from one Place to Another.

Experiment Solitary touching the *Right Side*, and the *Left*. 876

The *Senses* are alike Strong, both on the *Right Side*, and on the *Left*; But the *Limbes* on the *Right Side* are Stronger. The *Cause* may be, for that the *Braine*, which is the *Instrument* of *Sense*, is alike on both *Sides*; But *Motion*, and *Habilities* of *Mouing*, are somewhat holpen from the *Liuer*, which lieth on the *Right Side*. It may be also, for that the *Senses* are put in *Exercise*, indifferently, on both *Sides*, from the time of our Birth; But the *Limbes* are vsed most on the *Right Side*, whereby *Custome* helpeth; For we see that some are *Left-Handed*: Which are such, as haue vsed the *Left-Hand* most.

Experiment Solitary touching *Frictions*. 877

Frictions make the *Parts* more *Fleshie* and *Full*: As wee see both in *Men*; And in *Currying* of *Horses*, &c. The *Cause* is, for that they draw greater *Quantity* of *Spirits* and *Bloud* to the *Parts*: And againe, because they draw the *Aliment* more forcibly from within: And againe, because they relax the *Pores*, and so make better *Passage* for the *Spirits*, *Bloud*, and *Aliment*: Lastly, because they dissipate and disgest any *Inutile* or *Excrementitious*

crementitious *Moisture*, which lieth in the *Flesh:* All which helpe *Assimilation*. *Frictions* also doe more *Fill*, and *Impinguate* the *Body*, than *Exercise*. The *Cause* is, for that in *Frictions*, the *Inward Parts* are at rest; Which in *Exercise* are beaten (many times) too much: And for the same Reason, (as we haue noted heretofore) *Gally-Slaues* are *Fat* and *Fleshie*, because they stirre the *Limmes* more, and the *Inward Parts* lesse.

Experiment Solitary touching *Globes* appearing *Flat* at *Distance*. 878

ALL *Globes* afar off appeare *Flat*. The *Cause* is, for that *Distance* being a *Secundary Obiect of Sight*, is not otherwise discerned, than by more or lesse *Light*; which *Disparity* when it cannot be discerned, all seemeth *One:* As it is (generally) in *Obiects* not distinctly discerned; For so *Letters*, if they be so farre off, as they cannot be discerned, shew but as a *Duskish Paper:* And all *Engrauings* and *Embossings*, (a farre off) appeare *Plaine*.

Experiment Solitary touching *Shadowes*. 879

THe *Vtmost Parts* of *Shadowes* seeme euer to *Tremble*. The *Cause* is, for that the little *Moats*, which we see in the *Sun*, doe euer Stirre, though there be no *Wind*; And therefore those Mouing, in the Meeting of the *Light* and the *Shadow*, from the *Light* to the *Shadow*, and from the *Shadow* to the *Light*, doe shew the *Shadow* to Moue, because the *Medium* Moueth.

Experiment Solitary touching the *Rowling* and *Breaking* of the *Seas* 880

SHallow and *Narrow Seas*, breake more than *Deepe* and *Large*. The *Cause* is, for that the *Impulsion* being the same in Both; Where there is greater *Quantitie* of *Water*, and likewise *Space* Enough; there the *Water* Rowleth and Moueth, both more Slowly, and with a Sloper Rise, and Fall: But where there is lesse *Water*, and lesse *Space*, and the *Water* dasheth more against the Bottome, there it moueth more Swiftly, and more in *Precipice*; For in the *breaking* of the *Waues* there is euer a *Precipice*.

Experiment Solitary touching the *Dulcoration* of *Salt-water*. 881

IT hath beene obserued by the *Ancients*, that *Salt Water Boyled*, or *Boyled* and *Cooled* againe, is more *Potable*, than of it selfe *Raw:* And yet the *Taste* of *Salt* in *Distillations* by *Fire*, riseth not; For the *Distilled Water* will be *Fresh*. The *Cause* may be, for that the *Salt Part* of the *Water*, doth partly rise into a Kinde of *Scumme* on the *Top*; And partly goeth into a *Sediment* in the *Bottome:* And so is rather a *Separation*, than an *Euaporation*. But it is too grosse to rise into a *Vapour:* And so is a *Bitter Taste* likewise; For Simple *Distilled Waters*, of *Wormewood*, and the like, are not Bitter.

Experiment Solitary touching the *Returne* of *Saltnesse* in *Pits* vpon the *Sea-Shore*. 882

IT hath beene set downe before, that *Pits* vpon the *Sea-Shore*, turne into *Fresh Water* by *Percolation* of the *Salt* through the *Sand:* But it is further noted, by some of the *Ancients*, that in some Places of *Affricke*, after a time, the *Water* in such *Pits* will become *Brackish* againe. The *Cause* is, for that after a time, the very *Sands*, thorow which the *Salt-water* passeth, become *Salt*; And so the *Strainer* it selfe is tincted with

Salt.

Salt. The remedy therefore is, to digge ſtill *New Pits*, when the old wax *Brackiſh*, As if you would change your *Strainer*.

IT hath beene obſerued by the *Ancients*, that *Salt Water*, will diſſolue *Salt* put into it, in leſſe time, than *Freſh-water* will diſſolue it. The *Cauſe* may be, for that the *Salt* in the *Precedent Water*, doth, by *Similitude* of *Subſtance*, draw the *Salt* new put in, vnto it; Whereby it diffuſeth in the *Liquor* more ſpeedily. This is a Noble *Experiment*, if it be true; For it ſheweth Meanes of more Quicke and Eaſie *Infuſions*; And it is likewiſe a good *Inſtance* of *Attraction*, by *Similitude* of *Subſtance*. Try it with *Sugar* put into *Water*, formerly *Sugred*; And into other *Water Vnſugred*.

Experiments Solitary touching *Attraction* by *Similitude* of *Subſtance*. 883

PVt *Sugar* into *Wine*, part of it aboue, part vnder the *Wine*; And you ſhall finde, (that which may ſeeme ſtrange,) that the *Sugar* aboue the *Wine*, will ſoften and diſſolue ſooner, than that within the *Wine*. The *Cauſe* is, for that the *Wine* entreth that *Part* of the *Sugar*, which is vnder the *Wine*, by Simple *Infuſion*, or *Spreading*; But that *Part* aboue the *Wine* is likewiſe forced by *Sucking*: For all *Spungie Bodies* expell the *Aire*, and draw in *Liquor*, if it be Contiguous. As we ſee it alſo in *Spunges*, put part about the *Water*. It is worthy the Inquiry, to ſee how you may make more *Accurate Infuſions*, by helpe of *Attraction*.

Experiment Solitary touching *Attraction*. 884

WAter in *Wells* is *warmer* in *Winter*, than in *Summer*: And ſo *Aire* in *Caues*. The *Cauſe* is, for that in the Hither *Parts*, vnder the *Earth*, there is a *Degree* of ſome *Heat*; (As appeareth in *Sulphureous Veines*, &c.) Which ſhut cloſe in, (as in *Winter*) is the More; But if it Perſpire, (as it doth in *Summer*,) it is the Leſſe.

Experiment Solitary touching *Heat* vnder *Earth*. 885

IT is reported, that amongſt the *Leucacians*, in *Ancient* time, vpon a Superſtition, they did vſe to precipitate a *Man*, from a *High Cliffe* into the *Sea*; Tying about him, with ſtrings, at ſome diſtance, many great *Fowles*; And fixing vnto his *Body* diuers *Feathers*, ſpread, to breake the *Fall*. Certainly many *Birds*, of good *Wing*, (As *Kites*, and the like) would beare vp a good *Weight* as they flie; And *Spreading* of *Feathers*, thin and cloſe, and in great Breadth, will likewiſe beare vp a great *Weight*; Being euen laid, without Tilting vpon the Sides. The further *Extenſion* of this *Experiment* for *Flying* may be thought vpon.

Experiment Solitary touching *Flying* in the *Aire*. 886

THere is, in ſome Places, (namely in *Cephalonia*,) a little *Shrub*, which they call *Holy-Oake*, or *Dwarfe-Oake*: Vpon the *Leaues* whereof there riſeth a *Tumour*, like a *Bliſter*; Which they gather, and rub out of it, a certaine *Red Duſt*, that conuerteth (after a while) into *Wormes*, which they kill with *Wine*, (as is reported,) when they begin to Quicken: With this *Duſt* they die *Scarlet*.

Experiment Solitary touching the *Dye* of *Scarlet*. 887

IN *Zant*, it is very ordinary, to make *Men Impotent*, to accompany

with Experiment Solitary tou-

ching *Multiſi-liating.* 888

with their *Wiues.* The like is practiſed in *Gaſconie*; Where it is called *Nouërl'eguillette.* It is practiſed alwaies vpon the *Wedding Day.* And in *Zant*, the Mothers themſelues doe it, by way of Preuention; Becauſe thereby they hinder other *Charmes*, and can vndoe their Owne. It is a Thing the *Ciuill Law* taketh knowledge of; And therefore is of no Light Regard.

Experiment Solitary touching the *Riſe* of *Water*, by *Meanes* of *Flame.* 889

IT is a Common *Experiment*, but the *Cauſe* is miſtaken. Take a *Pot*, (Or better a *Glaſſe*, becauſe therein you may ſee the *Motion*,) And ſet a *Candle* lighted in the *Bottome* of a *Baſen* of *Water*; And turne the *Mouth* of the *Pot*, or *Glaſſe*, ouer the *Candle*, and it will make the *Water* riſe. They aſcribe it, to the *Drawing* of *Heat*; Which is not true: For it appeareth plainly to be but a *Motion* of *Nexe*, which they call *Ne detur vacuum*; And it proceedeth thus. The *Flame* of the *Candle*, as ſoone as it is couered, being ſuffocated by the *Cloſe Aire*, leſſeneth by little and little: During which time, there is ſome little Aſcent of *Water*, but not much: For the *Flame* Occupying leſſe and leſſe Roome, as it leſſeneth, the *Water* ſucceedeth. But vpon the *Inſtant* of the *Candles Going out*, there is a ſudden *Riſe*, of a great deale of *Water*; For that the *Body* of the *Flame* filleth no more Place; And ſo the *Aire*, and the *Water* ſucceed. It worketh the ſame *Effect*, if in ſtead of *Water*, you put *Flower*, or *Sand*, into the *Baſen*. Which ſheweth, that it is not the *Flames* drawing the *Liquour*, as *Nouriſhment*; As it is ſuppoſed; For all *Bodies* are alike vnto it; As it is euer in *Motion* of *Nexe*; Inſomuch as I haue ſeene the *Glaſſe*, being held by the Hand, hath lifted vp the *Baſen*, and all: The *Motion* of *Nexe*, did ſo Claſpe the *Bottome* of the *Baſen*. That *Experiment*, when the *Baſen* was lifted vp, was made with *Oyle*, and not with *Water*: Neuertheleſſe this is true, that at the very firſt *Setting* of the *Mouth* of the *Glaſſe*, vpon the *Bottome* of the *Baſen*, it draweth vp the *Water* a little, and then ſtandeth at a Stay, almoſt till the *Candles Going out*, as was ſaid. This may ſhew ſome *Attraction* at firſt: But of this we will ſpeake more, when we handle *Attractions* by *Heat*.

Experiments in Conſort touching the *Influences* of the *Moone.*

Of the *Power* of the *Celeſtiall Bodies*, and what more Secret *Influences* they haue, beſides the two Manifeſt *Influences* of *Heat*, and *Light*, We ſhall ſpeake, when we handle *Experiments* touching the *Celeſtiall Bodies*: Meane-while, wee will giue ſame Directions for more certaine *Trials*, of the *Vertues* and *Influences* of the *Moone*; which is our *Neareſt Neighbour.*

The *Influences* of the *Moone*, (moſt obſerued,) are Foure. The *Drawing forth* of *Heat*: The *Inducing* of *Putrifaction*: The *Increaſe* of *Moiſture*: The *Exciting* of the *Motions* of *Spirits.*

For

For the *Drawing forth* of *Heat*, we haue formerly preſcribed, to take *Water Warme*, and to ſet Part of it againſt the *Moone-Beames*; and Part of it with a *Skreene* between; And to ſee whether that which ſtandeth Expoſed to the *Beames*, will not *Coole* ſooner. But becauſe this is but a Small *Interpoſition*, (though in the *Sun* we ſee a Small *Shade* doth much,) it were good to try it, when the *Moone* ſhineth, & when the *Moone* ſhineth not at all; And with *Water Warme* in a *Glaſſe-Bottle*, as well as in a *Diſh*; And with *Cinders*; And with *Iron Red-Hot*; &c. 890

For the *Inducing* of *Putrifaction*, it were good to trie it with *Fleſh*, or *Fiſh*, Expoſed to the *Moone-Beames*; And againe Expoſed to the *Aire*, when the *Moone* ſhineth not, for the like time; To ſee whether will corrupt ſooner: And trie it alſo with *Capon*, or ſome other *Fowle*, layd aBroad, to ſee whether it will mortifie, and become tender ſooner? Trie it alſo with Dead *Flies*, or Dead *Wormes*, hauing a little *Water* caſt vpon them, to ſee whether will *Putrifie* ſooner. Trie it alſo with an *Apple*, or *Orenge*, hauing *Holes* made in their *Tops*, to ſee whether will Rot or Mould ſooner? Trie it alſo with *Holland-Cheeſe*, hauing *Wine* put into it; whether will breed *Mites* ſooner, or greater? 891

For the *Increaſe* of *Moiſture*, the Opinion Receiued is; That *Seeds* will grow ſooneſt, And *Haire*, and *Nailes*, and *Hedges*, and *Herbs*, Cut, &c. will grow ſooneſt, if they be Set, or Cut, in the *Increaſe* of the *Moone*. Alſo that *Braines* in *Rabits*, *Wood-cockes*, *Calues*, &c. are fulleſt in the *Full* of the *Moone*: And ſo of *Marrow* in the *Bones*: And ſo of *Oiſters*, and *Cockles*, which of all the reſt are the eaſieſt tried, if you haue them in *Pits*. 892

Take ſome *Seeds*, or *Roots*, (as *Onions*, &c.) and ſet ſome of them immediatly after the *Change*; And others of the ſame kinde immediately after the *Full*. Let them be as Like as can be: The *Earth* alſo the ſame as neere as may be; And therefore beſt in *Pots*: Let the *Pots* alſo ſtand, where no *Raine*, or *Sunne* may come to them, leſt the *Difference* of the *Weather* confound the *Experiment*: And then ſee in what Time, the *Seeds Set* in the *Increaſe* of the *Moone*, come to a certaine Height; And how they differ from thoſe that are *Set* in the *Decreaſe* of the *Moone*. 893

It is like, that the *Braine* of *Man* waxeth *Moiſter*, and *Fuller*, vpon the *Full* of the *Moone*: And therefore it were good for thoſe that haue *Moiſt Braines*, & are great *Drinkers*; to take *Fume* of *Lignum Aloes*, *Roſe-Mary*, *Frankincenſe*, &c. about the *Full* of the *Moone*. It is like alſo, that the *Humours* in *Mens Bodies*, Increaſe, and Decreaſe, as the *Moone* doth; And therefore it were good to Purge, ſome day, or two, after the *Full*; For that then the *Humours* will not repleniſh ſo ſoone againe. 894

As for the *Exciting* of the *Motion* of the *Spirits*, you muſt note that the *Growth* of *Hedges*, *Herbs*, *Haire*, &c. is cauſed from the *Moone*, by *Exciting* of the *Spirits*, as well by *Increaſe* of the *Moiſture*. But for *Spirits* in particular, the great *Inſtance* is in *Lunacies*. 895

There may be other Secret *Effects* of the *Influence* of the *Moone*, which are not yet brought into *Obſeruation*. It may be, that if it ſo fall out, 896

out, that the *Wind be North*, or *North-Eaſt*, in the *Full* of the *Moone*, it increaſeth *Cold*; And if *South*, or *South-Weſt*, it diſpoſeth the *Aire*, for a good while, to *warmth*, and *Raine*; Which would be obſerued.

897 It may be, that *Children*, and *Young Cattell*, that are *Brought forth* in the *Full* of the *Moone*, are ſtronger, and larger, than thoſe that are brought forth in the *Wane*: And thoſe alſo which are *Begotten* in the *Full* of the *Moone*: So that it might be good *Husbandry*, to put *Rams*, and *Bulls* to their *Female*, ſomewhat before the *Full* of the *Moone*. It may bee alſo, that the *Egges* lay'd in the *Full* of the *Moone*, breed the better *Bird*: And a Number of the like *Effects*, which may be brought into *Obſeruation*: *Quære* alſo, whether great *Thunders*, and *Earth-Quakes*, be not moſt in the *Full* of the *Moone*?

Experiment Solitary touching *Vinegar*. 898 THe *Turning* of *Wine* to *Vinegar*, is a Kinde of *Putrifaction*: And in *Making* of *Vinegar*, they vſe to ſet *Veſſels* of *Wine*, ouer againſt the *Noone-Sunne*; which calleth out the more *Oily Spirits*, and leaueth the *Liquour* more *Soure*, and *Hard*. Wee ſee alſo, that *Burnt-Wine* is more *Hard*, and *Aſtringent*, than *Wine Vnburnt*. It is ſaid, that *Cider* in *Nauigations* vnder the *Line* ripeneth, when *Wine* or *Beere* ſoureth. It were good to ſet a *Rundlet* of *Veriuice* ouer againſt the *Sunne*, in *Summer*, as they doe *Vinegar*, to ſee whether it will Ripen, and Sweeten.

Experiment Solitary touching *Creatures* that *Sleepe* all *Winter*. 899 THere be diuers *Creatures*, that *Sleepe* all *Winter*; As the *Beare*, the *Hedge-hogge*, the *Bat*, the *Bee*, &c. Theſe all wax *Fat* when they *Sleepe*, and egeſt not. The *Cauſe* of their *Fattening*, during their *Sleeping time*, may be the *Want* of *Aſſimilating*; For whatſoeuer *Aſſimilateth* not to *Fleſh*, turneth either to *Sweat*, or *Fat*. Theſe *Creatures*, for part of their *Sleeping Time*, haue beene obſerued not to *Stirre* at all; And for the other part, to *Stirre*, but not to *Remoue*. And they get *warme* and *Cloſe Places* to *Sleepe* in. When the *Flemmings* Wintred in *Noua Zembla*, the *Beares*, about the Middle of *Nouember*, went to *Sleepe*; And then the *Foxes* began to come forth, which Durſt not before. It is noted by ſome of the *Ancients*, that the *Shee-Beare* breedeth, and lyeth in with their Young, during that time of *Reſt*: And that a *Beare*, *Bigge* with *Young*, hath ſeldome beene ſeene.

Experiment Solitary touching the *Generating* of *Creatures* by *Copulation*, and by *Putrifaction*. 900 SOme *Liuing Creatures* are Procreated by *Copulation* betweene *Male*, and *Female*: Some by *Putrifaction*; And of thoſe which come by *Putrifaction*, many doe (neuertheleſſe) afterwards procreate by *Copulation*. For the *Cauſe* of both *Generations*: Firſt, it is moſt certaine, that the *Cauſe* of all *Viuification*, is a *Gentle*, and *Proportionable Heat*, working vpon a *Glutinous* and *Yeelding Subſtance*: For the *Heat* doth bring forth *Spirit* in that *Subſtance*: And the *Subſtance*, being *Glutinous*, produceth Two *Effects*: The One, that the *Spirit* is *Detained*, and cannot *Breake forth*: The Other, that the *Matter* being *Gentle*, and yeelding, is driuen forwards by the *Motion* of the *Spirits*, after ſome *Swelling* into *Shape*, and *Members*.

There-

Therefore all *Sperme*, all *Menſtruous Subſtance*, all *Matter* whereof *Creatures* are produced by *Putrifaction*, haue euermore a *Cloſeneſſe*, *Lentour*, and *Sequaſity*. It ſeemeth therefore, that the *Generation* by *Sperme* only, and by *Putrifaction*, haue two Different *Cauſes*. The firſt is, for that *Creatures* which haue a *Definite* and *Exact Shape*, (as thoſe haue which are procreated by *Copulation*,) cannot be produced by a *weake* and *Caſuall Heat*; Nor out of *Matter*, which is not *exactly Prepared*, according to the *Species*. The Second is, for that there is a greater *Time* required for *Maturation* of *Perfect Creatures*; For if the *Time* required in *Viuification* be of any length, then the *Spirit* will Exhale, before the *Creature* be *Matured*: Except it be Encloſed in a *Place* where it may haue *Continuance* of the *Heat*, *Acceſſe* of ſome *Nouriſhment* to maintaine it, and *Cloſeneſſe* that may keepe it from *Exhaling*. And ſuch *Places* are the *Wombes*, and *Matrices* of the *Females*. And therefore all *Creatures*, made of *Putrifaction*, are of more *Vncertaine Shape*; and are made in *Shorter Time*; And need not ſo Perfect an *Encloſure*, though ſome *Cloſeneſſe* be commonly required. As for the *Heathen Opinion* which was, that vpon great *Mutations* of the *world*, *Perfect Creatures* were firſt Engendred of *Concretion*; As well as *Frogs*, and *Wormes*, and *Flies*, and ſuch like, are now; Wee know it to be vaine. But if any ſuch Thing ſhould be admitted, Diſcourſing according to *Senſe*, it cannot be, except you admit a *Chaos* firſt, and *Commixture* of *Heauen*, and *Earth*. For the *Frame* of the *World*, once in Order, cannot effect it by any *Exceſſe* or *Caſualty*.

NATV-

NATVRALL HISTORIE.

X. Century.

THe *Philosophie* of *Pythagoras*, (which was full of *Superstition*,) did first plant a *Monstrous Imagination*; Which afterwards was, by the *Schoole* of *Plato*, and Others, Watered and Nourished. It was, that the *World* was *One Entire*, *Perfect*, *Liuing Creature*; In so much as *Appolonius* of *Tyana*, a *Pythagorean Prophet*, affirmed, that the *Ebbing* and *Flowing* of the *Sea*, was the *Respiration* of the *World*, drawing in *Water* as *Breath*, and putting it forth againe, They went on, and inferred; That if the *World* were a *Liuing Creature*, it had a *Soule*, and *Spirit*; Which also they held, calling it *Spiritus Mundi*; The *Spirit* or *Soule* of the *World*: By Which they did not intend *God*; (for they did admit of a *Deity* besides,) But only

Experiments in Consort, touching the *Transmission*, and *Influx* of *Immateriate Vertues*, and the *Force* of *Imagination*.

only the *Soule*, or *Eſſentiall Forme* of the *Vniuerſe*. This *Foundation* being laid, they mought build vpon it; what they would; For in a *Liuing Creature*, though neuer ſo great, (As for Example, in a great *Whale*,) the *Senſe*, and the *Affects* of an one *Part* of the *Body*, inſtantly make a *Tranſcurſion* throwout the whole *Body*: So that by this they did inſinuate, that no *Diſtance* of *Place*, nor *Want* or *Indiſpoſition* of *Matter*, could hinder *Magical Operations*; But that, (for Example,) we mought here in *Europe*, haue *Senſe* and *Feeling* of that, which was done in *China*: And likewiſe, we mought worke any *Effect*, *without*, and *againſt Matter*: And this, not Holpen by the *Cooperation* of *Angels*, or *Spirits*, but only by the *Vnity* and *Harmony* of *Nature*. There were ſome alſo, that ſtaid not here; but went further, and held; That if the *Spirit* of *Man*. (whom they call the *Microcoſme*,) doe giue a fit touch to the *Spirit* of the *World*, by ſtrong *Imaginations*, and *Beleefes*, it might command *Nature*; For *Paracelſus*, and ſome darkeſome *Authors* of *Magicke*, doe aſcribe to *Imagination Exalted*: the *Power* of *Miracle-working Faith*. With theſe vaſt and Bottomleſſe *Follies*, *Men* haue beene (in part) entertained.

But we, that hold firme to the *Workes* of *God*; And to the *Senſe*, which is *Gods Lampe*; (*Lucerna Dei Spiraculum Hominis*;) will enquire with all Sobriety, and Seueritie, whether there be to be found, in the Foot-Steps of *Nature*, any ſuch *Tranſmiſſion* and *Influx* of *Immateriate Vertues*; And what the *Force* of *Imagination* is; Either vpon the *Body Imaginant*, or vpon another *Body*: Wherein it will be like that *Labour* of *Hercules*, in Purging the *Stable* of *Augeas*, to ſeparate from *Superſtitious*, and *Magicall Arts*, and *Obſeruations*, any thing that is cleane, and pure *Naturall*; And not to be either Contemned, or Condemned. And although wee ſhall haue occaſion to ſpeake of this in more places than One, yet we will now make ſome Entrance thereinto.

Experiments in Conſort, *Monitory*, touching *Tranſmiſſion* of *Spirits*, and the *Force* of *Imagination*.

MEn are to be Admoniſhed, that they doe not withdraw Credit, from the *Operations* by *Tranſmiſſion* of *Spirits*, and *Force* of *Imagination*, becauſe the *Effects faile ſometimes*. For as in *Infection*, and *Contagion* from *Body* to *Body*, (as the *Plague*, and the like,) it is moſt certaine, that the

the *Infection* is receiued (many times) by the *Body Passiue*, but yet is by the *Strength*, and good *Disposition* thereof, Repulsed, and wrought out, before it bee formed into a *Disease*; So much more in *Impressions* from *Minde* to *Minde*, or from *Spirit* to *Spirit*, the *Impression* taketh, but is Encountred, and Ouercome, by the *Minde* and *Spirit*, which is *Passiue* before it worke any manifest *Effect*. And therefore, they worke most vpon *Weake Mindes*, and *Spirits*: As those of *Women*; *Sicke Persons*; *Superstitious*, and *Fearefull Persons*; *Children*, and *Young Creatures*.

Nescio quis teneros Oculus mihi fascinat Agnos:

The *Poet* speaketh not of *Sheepe*, but of *Lambs*. as for the *Weakenesse* of the *Power* of them, vpon *Kings*, and *Magistrates*; It may be ascribed (besides the maine, which is the *Protection* of *God*, ouer those that Execute his Place) to the *Weakenesse* of the *Imagination* of the *Imaginant*: For it is hard for a *Witch*, or a *Sorcerer*, to put on a Beleefe, that they can hurt such Persons.

Men are to be Admonished, on the other side, that they doe not easily giue Place and Credit to these *Operations*, because they *Succeed many times*; For the *Cause* of this *Successe*, is (oft) to bee truly ascribed, vnto the *Force* of *Affection* and *Imagination*, vpon the *Body Agent*; And then by a *Secondary Meanes*, it may worke vpon a *Diuers Body*: As for Example, If a man carry a *Planets Seale*, or a *Ring*, or some *Part* of a *Beast*, beleeuing strongly, that it will helpe him to obtaine his *Loue*; Or to keepe him from danger of hurt in *Fight*; Or to preuaile in a *Suit*; &c. it may make him more *Actiue*, and *Industrious*; And Againe, more *Confident*, and *Persisting*, than otherwise he would be. Now the great *Effects* that may come of *Industry*, and *Perseuerance*, (especially, in *Ciuill Businesse*,) who knoweth not? For wee see *Audacitie* doth almost binde and mate the *Weaker Sort* of *Minds*; And the *State* of *Humane Actions* is so variable, that to try Things oft, and neuer to giue ouer, doth Wonders: Therefore, it were a Meere *Fallacie* and *Mistaking*, to ascribe that to the *Force* of *Imagination*, vpon another *Body*, which is but the *Force* of *Imagination* vpon the Proper *Body*: For there is no doubt, but that *Imagination*, and *Vehement Affection*, worke greatly vpon the *Body* of the *Imaginant*: As we shall shew in due place. 902

Men are to be Admonished, that as they are not to mistake the *Causes* of these *Operations*; So much lesse, they are to mistake the *Fact*, or *Effect*; And rashly to take that for done, which is not done. And therefore, as diuers wise *Iudges* haue prescribed, and cautioned, *Men* may not too rashly beleeue, the *Confessions* of *Witches*, nor yet the *Euidence* against them. For the *Witches* themselues are *Imaginatiue*, and beleeue oft times, they doe that, which they doe not: And *People* are *Credulous* in that point, and ready to impute *Accidents*, and *Naturall Operations*, to *Witch-craft*. It is worthy the Obseruing, that both in *Ancient*, and *Late times*; (as in the *Thessalian Witches*, and the Meetings of *Witches* that haue beene recorded by so many late *Confessions*;) the great *Wonders* which they tell, of *Carrying* in the *Aire*; *Transforming* themselues into 903

other *Bodies*; &c. are ſtill reported to be wrought, not by *Incantations*, or *Ceremonies*; But by *Ointments*, and *Anointing* themſelues all ouer. This may iuſtly moue a *Man* to thinke, that theſe *Fables* are the *Effects* of *Imagination*: For it is certaine that *Ointments* doe all, (if they be laid on any thing thicke) by *Stopping* of the *Pores*, ſhut in the *Vapours*, and ſend them to the *Head* extremely. And for the Particlar *Ingredients* of thoſe *Magicall Ointments*, it is like they are *Opiate* and *Soporiferous*. For *Anointing* of the *Fore-Head*, *Necke*, *Feet*, *Back-Bone*, we know is vſed for Procuring *Dead Sleepes*: And if any *Man* ſay, that this *Effect* would bee better done by Inward *Potions*; Anſwer may bee made, that the *Medicines*, which goe to the *Ointments*, are ſo ſtrong, that if they were vſed Inwards, they would kill thoſe that vſe them: And therefore they worke Potently, though Outwards.

Wee will diuide the Seuerall Kindes of the *Operations*, by *Tranſmiſſion* of *Spirits*, and *Imagination*; Which will giue no ſmall Light to the *Experiments* that follow. All *Operations* by *Tranſmiſſion* of *Spirits*, and *Imagination* haue this; That they *Worke* at *Diſtance*, and not at *Touch*; And they are theſe being diuguiſhed.

904 The firſt is the *Tranſmiſſion* or *Emiſſion*, of the *Thinner*, and more *Airic Parts* of *Bodies*; As in *Odours*, and *Infections*; And this is, of all the reſt, the moſt *Corporeall*. But you muſt remember withall, that there be a Number of thoſe *Emiſſions*, both *Wholeſome*, and *Vnwholeſome*, that giue no *Smell* at all: For the *Plague*, many times, when it is taken, giueth no *Sent* at all: And there be many *Good* and *Healthfull Aires*, that doe appeare by *Habitation*, and other Proofes, that differ not in *Smell* from other *Aires*. And vnder this Head, you may place all *Imbibitions* of *Aire*, where the *Subſtance* is *Materiall*, *Odour-like*; Whereof ſome neuertheleſſe are ſtrange, and very ſuddenly diffuſed; As the *Alteration*, which the *Aire* receiueth in *Aegypt*, almoſt immediately, vpon the *Riſing* of the *Riuer* of *Nilus*, whereof we haue ſpoken.

905 The Second is the *Tranſmiſſion* or *Emiſſion* of thoſe *Things* that we call *Spirituall Species*; As *Viſibles* and *Sounds*: The one whereof wee haue handled; And the other we ſhall handle in due place. Theſe moue ſwiftly, and at great diſtance; But then they require a *Medium* well diſpoſed, And their *Tranſmiſſion* is eaſily ſtopped.

906 The Third is the *Emiſſions*, which cauſe *Attraction* of *Certaine Bodies* at *Diſtance*; Wherein though the *Loadſtone* be commonly placed in the Firſt Ranke, yet we thinke good to except it, and referre it to another *Head*: But the *Drawing* of *Amber*, and *Iet*, and other *Electricke Bodies*; And the *Attraction* in *Gold* of the *Spirit* of *Quick-Siluer*, at diſtance; And the *Attraction* of *Heat* at diſtance; And that of *Fire* to *Naphtha*; And that of ſome *Herbs* to *Water*, though at diſtance; And diuers others; We ſhall handle, but yet not vnder this preſent *Title*, but vnder the *Title* of *Attraction* in generall.

The

907 The Fourth is the *Emission* of *Spirits*; and *Immateriate Powers* and *Vertues*, in those Things, which worke by the *Vniuersall Configuration*, and *Sympathy* of the *World*; Not by *Formes*, or *Celestiall Influxes*, (as is vainly taught and receiued,) but by the *Primitiue Nature* of *Matter*; and the *Seeds* of *Things*. Of this kinde is, (as we yet suppose,) the *Working* of the *Load-Stone*, which is by *Consent* with the *Globe* of the *Earth*: Of this Kinde is the *Motion* of *Grauity*, which is by *Consent* of *Dense Bodies*, with the *Globe* of the *Earth*: Of this kinde is some *Disposition* of *Bodies* to *Rotation*, and particularly from *East* to *West*: Of which kinde wee conceiue the *Maine Float* and *Re-float* of the *Sea* is, which is by *Consent* of the *Vniuerse*, as Part of the *Diurnall Motion*. These *Immateriate Vertues* haue this Property differing from Others; That the *Diuersity* of the *Medium* hindreth them not; But they passe thorow all *Mediums*; yet at *Determinate distances*. And of these we shall speake, as they are incident to seuerall *Titles*.

908 The Fifth is the *Emissions* of *Spirits*; And this is the Principall in our Intention to handle now in this Place: Namely, the *Operation* of the *Spirits* of the *Minde* of *Man*, vpon other *Spirits*: And this is of a *Double Nature*: The *Operations* of the *Affections*, if they be vehement; And the *Operation* of the *Imagination*, if it bee Strong. But these two are so *Coupled*, as we shall handle them together: For when an *Enuious*, or *Amorous Aspect*, doth infect the *Spirits* of Another, there is ioyned both *Affection*, and *Imagination*.

909 The Sixth is, the Influxes of the *Heauenly Bodies*, besides those two Manifest Ones, of *Heat*, and *Light*. But these we will handle, where we handle the *Celestiall Bodies*, and *Motions*.

910 The Seuenth is the *Operations* of *Sympathy*; Which the *Writers* of *Naturall Magicke* haue brought into an *Art* or *Precept*: And it is this; That if you desire to Super-induce, any *Vertue* or *Disposition*, vpon a *Person*, you should take the *Liuing Creature*, in which that *Vertue* is most *Eminent*, and in *Perfection*: Of that *Creature* you must take the *Parts*, wherein that *Vertue* chiefly is *Collocate*: Againe, you must take those *Parts*, in the *Time*, and *Act*, when that *Vertue* is most in *Exercise*; And then you must apply it to that *Part* of *Man*, wherein that *Vertue* chiefly *Consisteth*. As if you would Super-induce *Courage* and *Fortitude*, take a *Lion*, or a *Cocke*; And take the *Heart*, *Tooth*, or *Paw* of the *Lion*; Or the *Heart*, or *Spurre* of the *Cocke*: Take those *Parts* immediately after the *Lion*, or the *Cocke* haue beene in *Fight*; And let them be worne, vpon a *Mans Heart*, or *Wrest*. Of these and such like *Sympathies*, we shall speake vnder this present *Title*.

911 The Eighth and last is, an *Emission* of *Immateriate Vertues*; Such as we are a little doubtfull to Propound; It is so prodigious: But that it is so constantly auouched by many: And wee haue set it downe, as a Law to our Selues, to examine things to the Bottome; And not to receiue vpon Credit, or reiect vpon Improbabilities, vntill there hath passed a due Examination. This is, the *Sympathy* of *Individuals*: For as

there is a *Sympathy* of *Species*; So (it may be) there is a *Sympathy* of *Individuals:* That is, that in *Things*, or the *Parts* of *Things*, that haue beene once *Contiguous*, or *Entire*, there ſhould remaine a *Tranſmiſſion* of *Vertue*, from the One to the Other: As betweene the *Weapon* and the *Wound*. Whereupon is blazed abroad the *Operation* of *Vnguentum Teli:* And ſo of a *Peece* of *Lard*, or *Sticke* of *Elder*, &c. that if *Part* of it be Conſumed or Putrified, it will worke vpon the other *Part Seuered*. Now wee will purſue the *Inſtances* themſelues.

Experiments in Confort touching *Emiſſion* of *Spirits* in *Vapour*, or *Exhalation*, *Odour-like*.

912 THe *Plague* is many times taken, without *Manifeſt Senſe*, as hath bin ſaid. And they report, that where it is found, it hath a Sent, of the *Smell* of a *Mellow Apple*; And (as ſome ſay) of *May-Flowers:* And it is alſo receiued, that *Smels* of *Flowers*, that are *Mellow* and *Luſhious*, are ill for the *Plague*; As *White Lillies*, *Cowſlips*, and *Hyacinths*.

913 The *Plague* is not eaſily receiued by ſuch, as continually are about them, that haue the *Plague*; As *Keepers* of the *Sicke*, and *Phyſitians*; Nor againe by ſuch as take *Antidotes*, either Inward, (as *Mithridate*; *Iuniper-Berries*; *Rue*, *Leafe* and *Seed*; &c.) Or outward, (as *Angelica*, *Zedoary*, and the like, in the Mouth; *Tarre*, *Galbanum*, and the like, in Perfume;) Nor againe by *Old People*, and ſuch as are of a *Dry* and *Cold Complexion*. On the other ſide, the *Plague* taketh ſooneſt hold of thoſe that come out of a *Freſh Aire*; And of thoſe that are *Faſting*; And of *Children*; And it is likewiſe noted to goe in a *Blond*, more than to a *Stranger*.

914 The moſt Pernicious *Infection*, next the *Plague*, is the *Smell* of the *Iayle*; When *Priſoners* haue beene Long, and Cloſe, and Naſtily kept; Whereof we haue had, in our time, Experience, twice, or thrice; when both the *Iudges* that ſate vpon the *Iayle*, and Numbers of thoſe that attended the Buſineſſe, or were preſent, *Sickned* vpon it, and *Died*. Therefore it were good wiſdome, that in ſuch Caſes, the *Iayle* were Aired, before they be brought forth.

915 Out of queſtion, if ſuch *Foule Smels* bee made by *Art*, and by the Hand, they conſiſt chiefly of *Mans Fleſh*, or *Sweat*, *Putrified*; For they are not thoſe *Stinkes*, which the *Noſthrils* Steight abhorre, and expell, that are moſt *Pernicious*; But ſuch *Aires*, as haue ſome Similitude with *Mans Body*; And ſo inſinuate themſelues, and betray the *Spirits*. There may be great danger, in vſing ſuch Compoſitions in great Meetings of People, within Houſes; As in *Churches*; At *Arraignments*; At *Playes* and *Solemnities*; And the like; For *Poiſoning* of *Aire* is no leſſe dangerous than *Poiſoning* of *Water*; Which hath beene vſed by the *Turkes* in the Warres; And was vſed by *Emanuel Commenus* towards the *Chriſtians*, when they paſſed thorow his *Countrey* to the *Holy Land*. And theſe *Empoiſonments* of *Aire*, are the more dangerous in *Meetings* of *People*; Becauſe the much *Breath* of *People*, doth further the *Reception* of the *Infection:* And therefore where any ſuch Thing is feared, it were good, thoſe *Publique Places* were perfumed, before the *Aſſemblies*.

916 The *Empoyſonment* of Particular *Perſons*, by *Odours*, hath beene reported

ported to be in *Perfumed Gloues*, or the like: And it is like, they Mingle the *Poison* that is deadly, with some *Smels* that are Sweet; which also maketh it the sooner received. *Plagues* also haue beene raised by *Anointings* of the *Chinkes* of *Doores*, and the like; Not so much by the Touch, as for that it is common for *Men*, when they finde any thing Wet vpon their Fingers, to put them to their *Nose*; Which Men therefore should take heed how they doe. The best is, that these *Compositions* of *Infectious Aires*, cannot bee made without *Danger* of *Death*, to them that make them. But then againe, they may haue some *Antidotes* to saue themselues; So that *Men* ought not to be secure of it.

There haue beene, in diuers *Countries*, great *Plagues*, by the *Putrifaction*, of great *Swarmes* of *Grasse-Hoppers*, and *Locusts*, when they haue beene dead, and cast vpon Heaps. 917

It hapneth oft in *Mines*, that there are *Damps*, which kill; either by *Suffocation*, or by the *Poisonous Nature* of the *Minerall*: And those that deale much in *Refining*, or other Workes about *Metalls*, and *Mineralls*, haue their *Braines* Hurt and Stupefied by the *Metalline Vapors*. Amongst which, it is noted, that the *Spirits* of *Quick-Silver*, either fly to the *Skull*, *Teeth*, or *Bones*; In so much as *Gilders* vse to haue a Peece of *Gold* in their *Mouth*, to draw the *Spirits* of the *Quick-Silver*; Which *Gold* afterwards they finde to be Whitened. There are also certaine *Lakes* and *Pits*, such as that of *Auernus*, that *Poison Birds* (as is said) which fly ouer them; Or *Men*, that stay too long about them. 918

The *Vapour* of *Char-Coale*, or *Sea-Coale*, in a Close Roome, hath killed many: And it is the more dangerous, because it commeth without any *Ill Smell*; But stealeth on by little and little; Enducing only a *Faintnesse*, without any *Manifest Strangling*. When the *Dutch-Men* Wintred at *Noua Zembla*, and that they could gather no more Sticks, they fell to make Fire of some *Sea-Coale* they had, wherewith (at first) they were much refreshed; But a little after they had sit about the *Fire*, there grew a Generall Silence, and lothnesse to speake amongst them; And immediately after, One of the *weakest* of the *Company*, fell downe in a Sowne; Whereupon they doubting what it was, opened their doore, to let in *Aire*, and so saued themselues. The *Effect* (no doubt) is wrought by the *Inspissation* of the *Aire*; And so of the *Breath* and *Spirits*. The like ensueth in *Roomes* newly *Plastered*, if a *Fire* be made in them; Whereof no lesse *Man* than the Emperour *Iouinianus* Died. 919

Vide the *Experiment*, 803. touching the *Infectious Nature* of the *Aire*, vpon the first *Showers*, after a long *Drought*. 920

It hath come to passe, that some *Apothecaries*, vpon *Stamping* of *Coloquintida*, haue beene put into a great *Skouring*, by the *Vapour* only. 921

It hath beene a Practice to burne a *Pepper*, they call *Ginny-Pepper*; Which hath such a strong *Spirit*, that it prouoketh a *Continuall Sneezing*, in those that are in the *Roome*. 922

It is an *Ancient Tradition*, that *Bleare-Eyes* infect *Sound-Eyes*; And that a *Menstruous Woman*, looking vpon a *Glasse*, doth rust it. Nay they 923

haue an *Opinion*, which seemeth *Fabulous*; That *Menstruous Women*, going ouer a *Field*, or *Garden*, doe *Corne* and *Herbs* good by *Killing* the *Wormes*.

924 The *Tradition* is no lesse *Ancient*, that the *Basiliske* killeth by *Aspect*; And that the *Wolfe*, if he see a *Man* first, by *Aspect* striketh a *Man* hoarse.

925 *Perfumes* Conuenient doe dry and strengthen the *Braine*; And stay *Rheumes* and *Defluxions*; As we finde in *Fume* of *Rose-Mary* dryed, and *Lignum Aloes*, and *Calamus*, taken at the *Mouth*, and *Nosthrils*; And no doubt there be other *Perfumes*, that doe moisten and refresh; And are fit to be vsed in *Burning Agues*, *Consumptions*, and too much *Wakefulnesse*; Such as are, *Rose-Water*, *Vinegar*, *Limon-pils*, *Violets*, the *Leaues* of *Vines* sprinckled with a little *Rose-Water*, &c.

926 They doe vse in *Sudden Faintings*, and *Swounings*, to put a *Handkerchiefe* with *Rose-Water*, or a *Little Vinegar*, to the *Nose*; Which gathereth together againe the *Spirits*, which are vpon point to resolue, and fall away.

927 *Tobacco* comforteth the *Spirits*, and dischargeth *Wearinesse*; Which it worketh partly by Opening; But chiefly by the *Opiate Vertue*, which condenseth the *Spirits*. It were good therefore to try the *Taking* of *Fumes* by *Pipes*, (as they doe in *Tobacco*,) of other *Things*; As well to dry and comfort, as for other *Intentions*. I wish Triall be made of the *Drying Fume*, of *Rose-Mary*, and *Lignum Aloes*, before mentioned, in *Pipe*; And so of *Nutmeg*, and *Folium Indum*; &c.

928 The *Following* of the *Plough*, hath beene approued, for refreshing the *Spirits*, and *Procuring Appetite*: But to doe it in the *Ploughing* for *Wheat*, or *Rie*, is not so good; Because the *Earth* hath spent her Sweet *Breath*, in *Vegetables*, put forth in *Summer*. It is better therefore to doe it, when you sow *Barley*. But because Ploughing is tied to *Seasons*, it is best to take the *Aire* of the *Earth*, new turned vp, by *Digging* with the *Spade*; Or *Standing* by him that *Diggeth*. *Gentlewomen* may doe themselues much good by kneeling vpon a Cushion, and *weeding*. And these Things you may practise in the best *Seasons*; Which is euer the *Early Spring*, before the *Earth* putteth forth the *Vegetables*; And in the *Sweetest Earth* you can chuse. It would be done also, when the *Dew* is a little off the *Ground*, lest the *Vapour* be too Moist. I knew a great *Man*, that liued Long, who had a Cleane *Clod* of *Earth*, brought to him euery *Morning*, as he sate in his *Bed*; And he would hold his *Head* ouer it, a good pretty while. I Commend also, sometimes, in *Digging* of *New Earth*, to powre in some *Malmesey*, or *Greeke Wine*; That the *Vapour* of the *Earth*, and *Wine* together, may comfort the *Spirits*, the more; Prouided alwaies, it be not taken for a *Heathen Sacrifice*, or *Libation* to the *Earth*.

929 They haue, in *Physicke*, Vse of *Pomanders*, and *Knots* of *Powders*, for *Drying* of *Rheumes*, *Comforting* of the *Heart*, *Prouoking* of *Sleepe*, &c. For though those *Things* be not so Strong as *Perfumes*, yet you may haue them continually in your *Hand*; whereas *Perfumes* you can take but at *Times*;

Times; And beſides, there be diuers *Things*, that breath better of themſelues, than when they come to the *Fire*; As *Nigella Romana*, the *Seed* of *Melanthium*, *Amomum*, &c.

There be two *Things*, which (inwardly vſed) doe Coole and condenſe the *Spirits*; And I with the ſame to be tried outwardly in *Vapours*. The one is *Nitre*, which I would haue diſſolued in *Malmeſey*, or *Greeke-Wine*, and ſo the *Smell* of the *Wine* taken; or if you would haue it more forcible, poure of it vpon a *Fire-pan*, well heated, as they doe *Roſe-Water*, and *Vinegar*. The other is, the *Diſtilled Water* of *Wilde Poppy*; which I wiſh to be mingled, at halfe, with *Roſe Water*, and ſo taken with ſome *Mixture* of a few *Cloues*, in a *Perfuming-Pan*. The like would be done with the *Diſtilled Water* of *Saffron Flowers*. 930

Smells of *Muſke*, and *Amber*, and *Ciuit*, are thought to further *Venereous Appetite*: Which they may doe by the *Refreſhing* and *Calling forth* of the *Spirits*. 931

Incenſe, and *Nidorous Smells*, (ſuch as were of *Sacrifices*,) were thought to Intoxicate the *Braine*, and to diſpoſe *Men* to *Deuotion*: Which they may doe, by a kinde of *Sadneſſe*, and *Contriſtation* of the *Spirits*: And partly alſo by *Heating*, and *Exalting* them. We ſee that amongſt the *Iewes*, the *Principall Perfume* of the *Sanctuary*, was forbidden all *Common Vſes*. 932

There be ſome *Perfumes*, preſcribed by the *Writers* of *Naturall Magicke*, which procure *Pleaſant Dreames*; And ſome others, (as they ſay,) that procure *Propheticall Dreames*; As the *Seeds* of *Flax*, *Fleawort*, &c. 933

It is certaine that *Odours* doe, in a ſmall Degree, Nouriſh; Eſpecially the *Odour* of *Wine*: And we ſee men a hungred, doe loue to ſmell *Hot Bread*. It is related, that *Democritus*, when he lay a dying, heard a *Woman*, in the Houſe, complaine, that ſhe ſhould be kept from being at a *Feaſt*, and *Solemnity*, (which ſhe much deſired to ſee,) becauſe there would be a *Corps* in the Houſe; Whereupon he cauſed *Loaues* of *New Bread* to be ſent for, and opened them, And powred a little *Wine* into them; And ſo kept himſelfe aliue with the *Odour* of them, till the *Feaſt* was paſt. I knew a *Gentleman*, that would faſt (ſometimes) three or foure, yea fiue dayes, without *Meat*, *Bread*, or *Drinke*; But the ſame *Man* vſed to haue continually, a great *Wiſpe* of *Herbs*, that he ſmelled on: and amongſt thoſe *Herbs*, ſome *Eſculent Herbs* of ſtrong *Sent*; As *Onions*. *Garlicke*, *Leekes*, and the like. 934

They doe vſe, for the *Accident* of the *Mother*, to burne *Feathers*, and other *Things* of *Ill Odour*: And by thoſe *Ill Smells*, the *Riſing* of the *Mother* is put downe. 935

There be *Aires*, which the *Phyſitians* aduiſe their *Patients* to remoue vnto, in *Conſumptions*, or vpon *Recouery* of *Long Sickneſſes*: which (commonly) are *Plaine Champaignes*, but *Graſing*, and not Ouer-growne with *Health*, or the like: Or elſe *Timber-Shades*, as in *Forreſts*, and the like. It is noted alſo, that *Groues* of *Bayes* doe forbid *Peſtilent Aires*: Which was accounted 936

accounted a great *Cauſe* of the Wholeſome *Aire* of *Antiochia*. There be alſo ſome *Soyles* that put forth *Odorate Herbs* of themſelues; As *Wilde Thyme*; *Wilde Maioram*; *Penny-Roiall*; *Camomill*; And in which the *Briar-Roſes* ſmell almoſt like *Muske-Roſes*; Which (no doubt) are *Signes* that doe diſcouer an *Excellent Aire*.

937 It were good for *Men*, to thinke of hauing *Healthfull Aire*, in their *Houſes*; Which will neuer be, if the *Roomes* be *Low-roofed*, or full of *Windowes*, and *Doores*; For the one maketh the *Aire Cloſe*, and not *Freſh*; And the other maketh it Exceeding *Vnequall*; Which is a great Enemy to *Health*. The *windowes* alſo ſhould not be high vp to the *Roofe*, (which is in vſe for Beautie, and Magnificence,) but low. Alſo *Stone-Walls* are not wholeſome; But *Timber* is more wholeſome; And eſpecially *Brick*. Nay it hath beene vſed by ſome, with great Succeſſe, to make their *walls* thicke; And to put a Lay of *Chalke* betweene the *Brickes*; to take away all *Dampiſhneſſe*.

Experiment Solitary touching the *Emiſſions* of *Spirituall Species* which *Affect* the *Senſes*.

938 THeſe *Emiſſions*, (as we ſaid before,) are handled, and ought to be handled, by themſelues, vnder their *Proper Titles*: That is, *Viſibles*, and *Audibles*, each a-part: In this place, it ſhall ſuffice to giue ſome generall *Obſeruations*, Common to both. Firſt, they ſeeme to be *Incorporeall*. Secondly, they Worke *Swiftly*. Thirdly, they Worke at *Large Diſtances*. Fourthly, in *Curious Varieties*. Fifthly, they are not *Effectiue* of any *Thing*; Nor leaue no *Worke* behinde them; But are *Energies* meerely; For their *Working* vpon *Mirrours*, and places of *Eccho*, doth not alter any Thing in thoſe *Bodies*; But it is the ſame *Action* with the *Originall*, only *Repercuſſed*. And as for the *Shaking* of *windowes*, or *Rarefying* the *Aire* by *Great Noyſes*; And the *Heat* cauſed by *Burning-Glaſſes*; They are rather *Concomitants* of the *Audible*, and *Viſible Species*, than the *Effects* of them. Sixthly, they ſeeme to be of ſo *Tender*, and *Weake a Nature*, as they affect onely ſuch a Rare, and Attenuate *Subſtance*, as is the *Spirit* of *Liuing Creatures*.

Experiments in Conſort, touching the *Emiſſion* of *Immateriate Vertues* from the *Mindes*, and *Spirits* of *Men*, either by *Affections*, or by *Imaginations*, or by other *Impreſſions*.

939 IT is mentioned in ſome *Stories*, that where *Children* haue beene *Expoſed*, or taken away young from their *Parents*; And that afterwards they haue approached to their *Parents* preſence, the *Parents*, (though they haue not knowne them,) haue had a *Secret Ioy*, or Other *Alteration* thereupon.

940 There was an *Ægyptian South-Sayer*, that made *Anthonius* beleeue, that his *Genius*, (which otherwiſe was *Braue*, and *Confident*,) was, in the Preſence of *Octauianus Cæſar*, *Poore*, and *Cowardly*: And therefore, he aduiſed him, to abſent himſelfe, (as much as hee could,) and remoue farre from him. This *South-Sayer* was thought to bee ſuborned by *Cleopatra*, to make him liue in *Ægypt*, and other Remote *Places* from *Rome*. Howſoeuer the Conceit of a *Predominant* or *Maſtering Spirit*, of one *Man* ouer Another, is Ancient, and Receiued ſtill, euen in *Vulgar Opinion*.

There

There are Conceits, that some *Men*, that are of an *Ill*, and *Melancholy Nature*, doe incline the *Company*, into which they come, to bee *Sad*, and *Ill disposed*; And contrariwise, that Others, that are of a *Iouiall Nature*, doe dispose the *Company to be Merry* and *Cheerefull*. And againe, that some *Men* are *Luckie* to be *kept Company* with, and *Employed*; And Others *Vnluckie*. Certainly, it is agreeable to *Reason*, that there are, at the least, some *Light Effluxions* from *Spirit* to *Spirit*, when *Men* are in *Presence*, one with another, as well as from *Body* to *Body*. 941

It hath beene obserued, that *Old Men*, who haue loued *Young Company*, and beene Conuersant continually with them, haue beene of *Long Life*; Their *Spirits*, (as it seemeth,) being Recreated by such *Company*. Such were the *Ancient Sophists*, and *Rhetoricians*; Which euer had *Young Auditors*, and *Disciples*; As *Gorgias*, *Protagoras*, *Isocrates*, &c. Who liued till they were an Hundred yeares Old. And so likewise did many of the *Grammarians*, and *Schoole-Masters*; such as was *Orbilius*, &c. 942

Audacitie and *Confidence* doth, in Ciuill Businesse, so great Effects, as a *Man* may (reasonably) doubt, that besides the very *Daring*, and *Earnestnesse*, and *Persisting* and *Importunitie*, there should be some *Secret Binding*, and *Stooping* of other *Mens Spirits*, to such *Persons*. 943

The *Affections*, (no doubt) doe make the *Spirits* more *Powerfull*, and *Actiue*; And especially those *Affections*, which draw the *Spirits*, into the *Eyes*: Which are two: *Loue*, and *Enuy*, which is called *Oculus Malus*: As for *Loue*; the *Platonists*, (some of them,) goe so farre, as to hold that the *Spirit* of the *Louer*, doth passe into the *Spirits*, of the *Person Loued*; Which causeth the desire of Returne into the *Body*, whence it was *Emitted*: Whereupon followeth that *Appetite* of *Contact*, and *Coniunction*, which is in *Louers*. And this is obserued likewise, that the *Aspects* that procure *Loue*, are not *Gazings*, but *Sudden Glances*, and *Dartings* of the *Eye*. As for *Enuy*, that emitteth some *Maligne* and *Poisonous Spirit*, which taketh hold of the *Spirit* of Another; And is likewise of greatest Force, when the *Cast* of the *Eye* is *Oblique*. It hath beene noted also, that it is most Dangerous, when an *Enuious Eye* is cast vpon *Persons* in *Glory*, and *Triumph*, and *Ioy*. The *Reason* whereof is, for that, at such times, the *Spirits* come forth most, into the *Outward Parts*, and so meet the *Percussion* of the *Enuious Eye*, more at *Hand*: And therefore it hath beene noted, that after great *Triumphs*, *Men* haue beene ill disposed, for some Dayes following. Wee see the Opinion of *Fascination* is Ancient, for both *Effects*: Of Procuring *Loue*; And *Sicknesse* caused by *Enuy*: And *Fascination* is euer by the *Eye*. But yet if there be any such *Infection* from *Spirit* to *Spirit*, there is no doubt, but that it worketh by *Presence*, and not by the *Eye* alone; Yet most forcibly by the *Eye*. 944

Feare, and *Shame*, are likewise *Infectiue*; for wee see that the *Starting* of one will make another ready to *Start*: And when one *Man* is out of *Countenance* in a *Company*, others doe likewise *Blush* in his behalfe. 945

Now

Now we will ſpeake of the *Force* of *Imagination* vpon other *Bodies*; And of the *Meanes* to *Exalt* and *Strengthen* it. *Imagination*, in this Place, I vnderſtand to be, the *Repreſentation* of an *Indiuiduall Thought*. *Imagination* is of three Kinds: The Firſt *Ioyned* with *Beleefe* of that which is to *Come*: The Second *Ioyned* with *Memory* of that which is *Paſt*: And the Third is of *Things Preſent*, or as if they were *Preſent*; For I comprehend in this, *Imaginations Faigned*, and at *Pleaſure*; As if one ſhould *Imagine* ſuch a *Man* to be in the *Veſtments* of a *Pope*; Or to haue *Wings*. I ſingle out, for this time, that which is with *Faith*, or *Beleefe* of that which is to *Come*. The *Inquiſition* of this *Subiect*, in our way, (which is by *Induction*.) is wonderfull hard; for the *Things* that are reported, are Full of *Fables*; And *New Experiments* can hardly be made, but with Extreme Caution, for the Reaſon which we will hereafter declare.

The *Power* of *Imagination* is in three Kindes; The Firſt, vpon the *Body* of the *Imaginant*; Including likewiſe the *Childe* in the *Mothers Wombe*; The Second is, the *Power* of it vpon *Dead Bodies*, as *Plants*, *Wood*, *Stone*, *Metall*. &c. The Third is, the *Power* of it, vpon the *Spirits* of *Men* and *Liuing Creatures*: And with this laſt we will only meddle.

The *Probleme* therefore is, whether a *Man Conſtantly* and *Strongly Beleeuing*, that ſuch a *Thing* ſhall be; As that ſuch an *One* will *Loue Him*; Or that ſuch an *One* will *Grant him* his *Requeſt*; Or that ſuch an *One* ſhall *Recouer* a *Sickeneſſe*; Or the like;) It doth helpe any thing to the *Effecting* of the *Thing* it ſelfe. And here againe wee muſt warily diſtinguiſh; For it is not meant, (as hath beene partly ſaid before,) that it ſhould helpe by *Making* a *Man* more *Stout*, or more *Induſtrious*; (In which kinde a *Conſtant Beleefe* doth much;) But meerely by a *Secret Operation*, or *Binding*, or *Changing* the *Spirit* of *Another*: And in this it is hard, (as we began to ſay,) to make any *New Experiment*; For I cannot *command* my Selfe to *Beleeue* what I will, and ſo no *Triall* can be made. Nay it is worſe; For whatſoeuer a *Man Imagineth doubtingly*, or with *Feare*, muſt needs doe hurt, if *Imagination* haue any *Power* at all;

For

For a *Man* repreſenteth that other, that he feareth, than the contrary.

The Helpe therefore is, for a *Man* to worke by *Another*, in whom hee may Create *Beleefe*, and not by *Himſelfe*; Vntill *Himſelfe* haue found by *Experience*, that *Imagination* doth preuaile; For then *Experience* worketh in *Himſelfe Beleefe*; If the *Beleefe*, that ſuch a *Thing* ſhall be, be ioyned with a *Beleefe*, that his *Imagination* may procure it.

946 For Example; I related one time to a *Man*, that was Curious, and Vaine enough in theſe Things; *That I ſaw a Kinde of* Iugler, *that had a* Paire *of* Cards, *and would tell a* Man *what* Card *he thought*. This Pretended Learned Man told me; It was a Miſtaking in Me; *For (ſaid he) it was not the* Knowledge *of the* Mans Thought, (*for that is proper to* God,) *but it was the* Inforcing *of a* Thought *vpon him, and* Binding *his* Imagination *by a* Stronger, *that he could* Thinke no other *Card*. And thereupon he asked me a *Queſtion*, or two, which I thought he did but cunningly, knowing before what vſed to be the *Feats* of the *Iugler*. *Sir, (ſaid he,) doe you remember whether he told the* Card, *the* Man *thought*, Himſelfe, *or bade* Another *to tell it*. I anſwered (as was true;) *That he bade Another tell it*. Whereunto he ſaid; *So I thought: For (ſaid he) Himſelfe could not haue put on ſo ſtrong an* Imagination; *But by telling the other the* Card, (*who beleeued that the* Iugler *was ſome Strange* Man, *and could doe Strange* Things,) *that other* Man *caught a ſtrong* Imagination. I harkened vnto him, thinking for a Vanity he ſpoke prettily. Then he asked me another *Queſtion:* Saith he, *Doe you remember whether he bade the* Man *thinke the* Card *firſt, and afterwards told the other* Man *in his Eare, what hee ſhould thinke, Or elſe that he did whiſper firſt in the* Mans *Eare, that ſhould tell the* Card, *telling that ſuch a* Man *ſhould thinke ſuch a* Card, *and after bade the* Man *thinke a* Card? I told him, as was true; *That he did firſt whiſper the* Man *in the Eare, that ſuch a* Man *ſhould thinke ſuch a* Card; Vpon this the *Learned Man* did much Exult, and Pleaſe himſelfe, ſaying; *Loe, you may ſee that my* Opinion *is right: For if the* Man *had thought firſt, his* Thought *had beene Fixed; But the other* Imagining *firſt, bound his* Thought. Which though it did ſomewhat ſinke with mee, yet I made Lighter than I thought, and ſaid; *I thought it was* Confederacie, *betweene the* Iugler, *and the two* Seruants: Though (Indeed) I had no Reaſon ſo to thinke: For they were both my *Fathers* Seruants; And he had neuer plaid in the Houſe before. The *Iugler* alſo did cauſe a *Garter* to be held vp; And tooke vpon him, to know, that ſuch a *One*, ſhould point in ſuch a *Place*, of the *Garter*; As it ſhould be neare ſo many *Inches* to the *Longer End*, and ſo many to the *Shorter*; And ſtill he did it, by *Firſt Telling* the *Imaginer*, and after *Bidding* the *Actor Thinke*.

Hauing told this *Relation*, not for the Weight thereof, but becauſe

becauſe it doth handſomely open the *Nature* of the *Queſtion*; I returne to that I ſaid; That *Experiments* of *Imagination*, muſt be practiſed by Others, and not by a *Mans* Selfe. For there be Three *Meanes* to fortifie *Beleefe*: the Firſt is *Experience*: The Second is *Reaſon*: And the Third is *Authority*: And that of theſe, which is farre the moſt *Potent*, is *Authoritie*: For *Beleefe* vpon *Reaſon* or *Experience* will Stagger.

947 For *Authority*, it is of two Kindes: *Beleefe* in an *Art*; And *Beleefe* in a *Man*. And for Things of *Beleefe* in an *Art*; A man may exerciſe them by *Himſelfe*; But for *Beleefe* in a *Man*, it muſt be by *Another*. Therefore, if a *Man* beleeue in *Aſtrologie*, and finde a *Figure* Proſperous; Or beleeue in *Naturall Magicke*, that a *Ring* with ſuch a *Stone*, or ſuch a *Peece* of a *Liuing Creature*, Carried, will doe good; It may helpe his *Imagination*: But the *Beleefe* in a *Man* is farre the more *Actiue*. But howſoeuer all *Authority* muſt be out of a *Mans Selfe*, turned (as was ſaid,) either vpon an *Art*, or vpon a *Man*: And where *Authority* is from one *Man* to another, there the Second muſt be *Ignorant*, and not *Learned*, or *Full* of *Thoughts*; And ſuch are (for the moſt part) all *Witches*, and *Superſtitious Perſons*; Whoſe *Beleefes*, tied to their *Teachers*, and *Traditions* are no whit controlled, either by *Reaſon* or *Experience*: And vpon the ſame Reaſon, in *Magicke*, they vſe (for the moſt part,) *Boyes*, and *Young People*, whoſe *Spirits* eaſilieſt take *Beleefe* and *Imagination*.

Now to fortifie *Imagination*, there be three Wayes: The *Authority* whence the *Beleefe* is deriued; *Meanes* to *Quicken* and *Corroborate* the *Imagination*; And *Meanes* to *Repeat* it, and *Refreſh* it.

948 For the *Authoritie*, wee haue already ſpoken; As for the Second; Namely the *Meanes* to *Quicken*, and *Corroborate* the *Imagination*; We ſee what hath beene vſed in *Magick*; (If there be in thoſe Practiſes any thing that is purely *Naturall*;) As *Veſtments*; *Characters*; *Words*; *Seales*; Some *Parts* of *Plants*, or *Liuing Creatures*; *Stones*; *Choice* of the *Houre*; *Geſtures* and *Motions*; Alſo *Incenſes*, and *Odours*; *Choice* of *Society*, which increaſeth *Imagination*; *Diets* and *Preparations* for ſome time before. And for *words*, there haue beene euer vſed, either *Barbarous Words*, of no Senſe, leſt they ſhould diſturbe the *Imagination*; Or *words* of *Similitude*, that may ſecond and feed the *Imagination*: And this was euer as well in *Heathen Charmes*, as in *Charmes of* latter Times. There are vſed alſo *Scripture words*; For that the *Beleefe*, that *Religious Texts*, and *Words*, haue Power, may ſtrengthen the *Imagination*. And for the ſame Reaſon, *Hebrew Words*, (which amongſt vs is counted the *Holy Tongue*, and the *Words* more *Myſticall*,) are often vſed.

949 For the *Refreſhing* of the *Imagination*, (which was the Third *Meanes* of *Exalting* it;) Wee ſee the Practiſes of *Magicke*, as in *Images* of *Wax* and

and the like, that should Melt by little, and little; Or some other *Things Buried* in *Mucke*, that should Putrifie by little and little; Or the like: For so oft as the *Imaginant* doth thinke of those Things, so oft doth he represent to his *Imagination*, the *Effect* of that he desireth.

If there be any *Power* in *Imagination*, it is lesse credible, that it should be so *Incorporeall* and *Imateriate* a *Vertue*, as to work at great *Distances*; Or through all *Mediums*; Or upon all *Bodies*: But that the *Distance* must be Competent; The *Medium* not Aduerse; And the *Body* Apt and Proportionate. Therefore if there be any Operation vpon *Bodies*, in Absence, by Nature; it is like to be conueyed from *Man* to *Man*, as *Fame* is; As if a *Witch* by *Imagination*, should hurt any a farre off, it cannot bee naturally, but by Working vpon the *Spirit* of some, that commeth to the *Witch*; And from that *Party* vpon the *Imagination* of *Another*; And so vpon *Another*; till it come to one that hath resort to the *Party Intended*; And so by *Him* to the *Party intended himselfe*. And although they speake, that it sufficeth, to take a *Point*, or a *Peece* of the *Garment*, or the *Name* of the *Party*, or the like; yet there is lesse Credit to be giuen to those Things, except it be by *Working* of euill *Spirits*. 950

The *Experiments*, which may certainly demonstrate the *Power* of *Imagination*, vpon other *Bodies*, are few, or none: For the *Experiments* of *Witchcraft*, are no cleare Proofes; For that they may bee, by a Tacite *Operation* of *Maligne Spirits*: We shall therefore be forced, in this *Enquirie*, to resort to New *Experiments*: Wherein wee can giue only *Directions* of *Trials*, and not any *Positiue Experiments*. And if any *Man* thinke, that we ought to haue staied, till We had made *Experiment*, of some of them our selues (as wee doe commonly in other *Titles*) the Truth is, that these *Effects* of *Imagination* vpon other *Bodies*, haue so little Credit with vs, as we shall try them at leisure: But in the meane Time, we will lead others the way.

When you worke by the *Imagination* of *Another*, it is necessary, that Hee, by whom you worke, haue a *Precedent Opinion* of you, that you can doe Strange Things; Or that you are a *Man* of *Art*, as they call it; For else the Simple *Affirmation* to Another, that this or that shall be, can worke but a weake *Impression* in his *Imagination*. 951

It were good, because you cannot discerne fully of the *Strength* of *Imagination*, in one *Man* more than another, that you did vse the *Imagination* of more than *One*; That so you may light vpon a *Strong One*. As if a *Physitian* should tell Three, or Foure, of his *Patients Seruants*, that their *Master* shall surely recouer. 952

The *Imagination* of *One*, that you shall vse, (such is the Variety of *Mens Mindes*,) cannot be alwaies alike *Constant*, and *Strong*; And if the 953

Succeſſe follow not ſpeedily, it will faint and leeſe *Strength*. To remedy this, you muſt pretend to Him, whoſe *Imagination* you vſe, ſeuerall *Degrees* of *Meanes*, by which to *Operate*; As to preſcribe him, that euery three Daies, if he finde not the Succeſſe Apparant, he doe vſe another *Root*, or *Part* of a *Beaſt*, or *Ring*, &c. As being of more *Force*; And if that faile, Another; And if that, Another; till Seuen Times. Alſo you muſt preſcribe a good Large Time for the *Effect* you promiſe; As if you ſhould tell a *Seruant* of a *Sick-man*, that his *Maſter* ſhall recouer, but it will be Fourteene daies, ere hee findeth it apparantly, &c. All this to entertaine the *Imagination*, that it wauer leſſe.

954 It is certaine, that *Potions*, or *Things* taken into the *Body*: *Incenſes* and *Perfumes* taken at the *Noſthrils*; And *Ointments* of ſome *Parts*; doe (naturally) worke vpon the *Imagination* of Him that taketh them. And therefore it muſt needs greatly *Cooperate* with the *Imagination* of him, whom you vſe, if you preſcribe him, before he doe vſe the *Receit*, for the *Worke* which he deſireth, that hee doth take ſuch a *Pill*, or a *Spoonfull* of *Liquor*; Or burne ſuch an *Incenſe*; Or *Anoint* his *Temples*, or the *Soles* of his *Feet*, with ſuch an *Ointment*, or *Oyle*: And you muſt chuſe, for the *Compoſition* of ſuch *Pill*, *Perfume*, or *Ointment*, ſuch *Ingredients*, as doe make the *Spirits*, a little more *Groſſe*, or *Muddy*: Whereby the *Imagination* will fix the better.

955 The *Body Paſsiue*, and to be *wrought Vpon*, (I meane not of the *Imaginant*,) is better wrought vpon (as hath beene partly touched) at ſome *Times*, than at others: As if you ſhould preſcribe a *Seruant*, about a *Sick Perſon* (whom you haue poſſeſſed, that his *Maſter* ſhall recouer) when his *Maſter* is faſt a ſleepe, to vſe ſuch a *Root*, or ſuch a *Root*. For *Imagination* is like to worke better vpon *Sleeping Men*, than *Men Awake*. As we ſhall ſhew when we handle *Dreames*.

956 We finde in the *Art* of *Memory*, that *Images Viſible*, worke better than other *Conceits*: As if you would remember the Word *Philoſophy*, you ſhall more ſurely do it, by *Imagining* that ſuch a *Man*, (For *Men* are beſt *Places*) is reading vpon *Ariſtotles Phyſickes*; Than if you ſhould Imagine him to ſay; *I le goe ſtudy Philoſophy*. And therefore, this *Obſeruation* would be tranſlated to the *Subiect* wee now ſpeake of: For the more Luſtrous the *Imagination* is, it filleth and fixeth the better. And therefore I conceiue, that you ſhall, in that *Experiment* (whereof wee ſpake before) of *Binding* of *Thoughts*, leſſe faile, if you tell One, that ſuch an *One* ſhal name one of *Twenty Men*, than if it were *One* of *Twenty Cards*. The *Experiment* of *Binding* of *thoughts*, would be Diuerſified, and tried to the Full: And you are to note, whether it hit for the moſt part, though not alwaies.

957 It is good to conſider, vpon what *Things*, *Imagination* hath moſt Force: And the *Rule* (as I conceiue) is, that it hath moſt *Force* vpon *Things*, that haue the *Lighteſt*, and *Eaſieſt Motions*. And therefore aboue all, vpon the *Spirits* of *Men*: And in them, vpon ſuch *Affections*, as moue *Lighteſt*; As vpon *Procuring* of *Loue*; *Binding* of *Luſt*, which is

euer

euer with *Imagination*; vpon *Men* in *Feare*; Or *Men* in *Irresolution*; And the like. Whatsoeuer is of this kinde would be throughly enquired. *Trialls* likewise would be made vpon *Plants*, and that diligently: As if you should tell a *Man*, that such a *Tree* would Die this yeare; And will him, at these and these times, to goe vnto it, to see how it thriueth. As for *Inanimate Things*, it is true, that the *Motions* of *Shuffling* of *Cards*, or *Casting* of *Dice*, are very *Light Motions*; And there is a *Folly* very vsuall, that *Gamesters* imagine, that some that stand by them, bring them ill Lucke. There would be Triall also made, of holding a *Ring* by a *Threed* in a *Glasse*, and telling him that holdeth it, before, that it shall strike so many times against the *Side* of the *Glasse*, and no more; Or of Holding a *Key* betweene two *Mens Fingers*, without a *Charme*; And to tell those that hold it, that at such a *Name*, it shall goe off their *Fingers*: For these two are Extreme *Light Motions*. And howsoeuer I haue no *Opinion* of these things, yet so much I conceiue to be true; That *Strong Imagination* hath more Force vpon *Things Liuing*; Or that haue beene *Liuing*, than *Things* meerely *Inanimate*: And more Force likewise vpon *Light*, and *Subtill Motions*, than vpon *Motions Vehement*, or *Ponderous*.

It is an vsuall *Obseruation*, that if the *Body* of One *Murthered*, bee brought before the *Murtherer*, the *Wounds* will bleed a-fresh. Some doe affirme, that the *Dead Body*, vpon the Presence of the *Murtherer*, hath opened the *Eyes*; And that there haue beene such like *Motions*, as well where the *Party Murthered* hath beene *Strangled*, or *Drowned*, as where they haue beene *Killed* by *Wounds*. It may be, that this participateth of a *Miracle*; by *Gods* Iust Iudgement, who vsually bringeth *Murthers* to Light: But if it be *Naturall*, it must be referred to *Imagination*. 958

The *Tying* of the *Point* vpon the day of *Marriage*, to make *Men* Impotent towards their *Wiues*, which (as we haue formerly touched,) is so frequent in *Zant* and *Gascony*, if it be *Naturall*, must bee referred to the *Imagination* of *Him* that *Tieth* the *Point*. I conceiue it to haue the lesse Affinity with *Witchcraft*, because not Peculiar Persons onely, (such as *Witches* are) but any *Body* may doe it. 959

Experiments in Consort, touching the *Secret Vertue* of *Sympathy*, and *Antipathy*. 960

THere be many *Things* that worke vpon the *Spirits* of *Man*, by *Secret Sympathy*, and *Antipathy*: The *Vertues* of *Precious Stones*, worne, haue beene anciently and generally Receiued; And curiously assigned to worke seuerall *Effects*. So much is true; That *Stones* haue in them fine *Spirits*; As appeareth by their *Splendor*: And therefore they may worke by *Consent* vpon the *Spirits* of *Men*, to Comfort, and Exhilarate them. Those that are the best, for that *Effect*, are the *Diamond*, the *Emerald*, the *Iacinth Orientall*, and the *Gold-Stone*, which is the *Yellow Topaze*. As for their particular *Proprieties*, there is no Credit to be giuen to them. But it is manifest, that *Light*, aboue all things, excelleth in *Comforting* the *Spirits* of *Men*: And it is very probable, that *Light Varied* doth the same *Effect*, with more *Nouelty*. And this is one of the *Causes*, why *Precious Stones* comfort. And therefore it were good to haue *Tincted Lanthornes*,

or *Tinctted Skreenes*, of *Glaſſe Coloured* into *Greene*, *Blew*, *Carnation*, *Crimſon*, *Purple*, &c. And to vſe them with *Candles* in the *Night*. So likewiſe to haue Round *Glaſſes*, not only of *Glaſſe Coloured thorow*, but with *Colours* laid betweene *Cryſtals*, with *Handles* to hold in ones Hand. *Priſmes* are alſo Comfortable Things. They haue of *Paris-Worke*, *Looking-Glaſſes*, bordered with broad *Borders* of ſmall *Cryſtall*, and great Counterfeit *Pretious Stones*, of all *Colours* that are moſt Glorious and Pleaſant to behold; Eſpecially in the *Night*. The *Pictures* of *Indian Feathers*, are likewiſe Comfortable, and Pleaſant to behold. So alſo Faire and Cleere *Pooles* doe greatly comfort the *Eyes* and *Spirits*; Eſpecially when the *Sun* is not *Glaring*, but *Ouer-caſt*; Or when the *Moone* ſhineth.

961 There be diuers Sorts of *Bracelets* fit to *Comfort* the *Spirits*; And they be of Three *Intentions*: *Refrigerant*; *Corroborant*; and *Aperient*. For *Refrigerant*, I wiſh them to be of *Pearle*, or of *Corall*, as is vſed: And it hath beene noted that *Corall*, if the *Party* that weareth it be ill diſpoſed, will wax *Pale*: Which I beleeue to be true, becauſe otherwiſe *Diſtemper* of *Heat* will make *Corall* loſe Colour. I Commend alſo *Beads*, or little *Plates* of *Lapis Lazuli*; And *Beads* of *Nitre*, either alone, or with ſome *Cordiall Mixture*.

962 For *Corroboration* and *Confortation*, take ſuch *Bodies* as are of *Aſtringent Quality*, without *Manifeſt Cold*. I commend *Bead-Amber*; which is full of *Aſtriction*, but yet is *Vnctuous*, and not *Cold*; And is conceiued to *Impinguate* thoſe that weare ſuch *Beads*: I commend alſo, *Beads* of *Harts-Horne*, and *Iuory*, which are of the like Nature; Alſo *Orenge-Beads*; Alſo *Beads* of *Lignum Aloes*, *Macerated* firſt in *Roſe-Water*, and *Dried*.

963 For *Opening*, I Commend *Beads*, or *Peeces* of the *Roots* of *Cardnus Benedictus*: Alſo of the *Roots* of *Piony* the *Male*; And of *Orris*; And of *Calamus Aromaticus*; And of *Rew*.

964 The Crampe (no doubt,) commeth of *Contraction* of *Sinnewes*; Which is Manifeſt, in that it commeth either by *Cold* or *Drineſſe*, As after *Conſumptions*, and *Long Agues*: For *Cold* and *Drineſſe* doe (both of them) *Contract*, and *Corrugate*. Wee ſee alſo, that *Chafing* a little aboue the *Place* in paine, eaſeth the *Crampe*; Which is wrought by the *Dilatation*, of the *Contracted Sinnewes*, by *Heat*. There are in vſe for the Preuention of the *Crampe*, two Things; The one *Rings* of *Sea Horſe-Teeth*, worne vpon the *Fingers*; The other *Bands* of *Greene Periwinkle* (the Herbe) tied about the *Calfe* of the *Leg*, or the *Thigh*, &c. where the *Crampe* vſeth to come. I doe finde this the more ſtrange, becauſe Neither of theſe haue any *Relaxing Vertue*, but rather the Contrary. I iudge therefore, that their *Working* is, rather vpon the *Spirits*, within the *Nerues*, to make them ſtriue leſſe; Than vpon the *Bodily Subſtance* of the *Nerues*.

965 I would haue *Triall* made of two other *Kindes* of *Bracelets*, for *Comforting* the *Heart*, and *Spirits*; The one of the *Trochiſch* of *Vipers*, made into little *Peeces* of *Beads*; For ſince they doe great Good Inwards (eſpecially for *Peſtilent Agues*) it is like they will be Effectuall Outwards; Where they may be applied in greater *Quantity*. There would be *Trochiſh* likewiſe made

made of *Snakes*; Whose *Flesh dried*, is thought to haue a very *Opening*, and *Cordiall Vertue*. The other is, of *Beads* made of the *Scarlet Powder*, which they call *Kermes*; Which is the Principall *Ingredient* in their *Cordiall Confection Alkermes*: The *Beads* would bee made vp with *Amber-Grice*, and some *Pomander*.

It hath beene long receiued, and confirmed by diuers *Trialls*; That the Root of the *Male-Piony*, dried, tied to the *Necke*, doth helpe the *Falling-Sickenesse*; And likewise the *Incubus*, which wee call the *Mare*. The *Cause* of both these *Diseases*, and especially of the *Epilepsie* from the *Stomach*, is the *Grossenesse* of the *Vapours*, which rise and enter into the *Cells* of the *Braine*: And therefore the *Working* is, by *Extreme*, and *Subtill Attenuation*; Which that *Simple* hath. I Iudge the like to be in *Castoreum*, *Muske*, *Rew-Seed*, *Agnus Castus Seed*, &c. 966

There is a *Stone*, which they call the *Bloud-Stone*, which worne is thought to be good for them that *Bleed* at the *Nose*: Which (no doubt) is by *Astriction* and *Cooling* of the *Spirits*. *Quare*, if the *Stone* taken out of the *Toads Head*, be not of the like Vertue? For the *Toad* loueth *Shade*, and Coolenesse. 967

Light may bee taken from the *Experiment* of the *Horse-Tooth-Ring*, and the *Garland* of *Periwinckle*, how that those things which asswage the *Strife* of the *Spirits*, doe helpe diseases, contrary to the *Intention* desired: For in the *Curing* of the *Crampe*, the *Intention* is to relax the *Sinewes*; But the *Contraction* of the *Spirits*, that they striue lesse, is the best Helpe: So to procure easie *Trauailes* of *Women*, the Intension is to bring downe the *Childe*; But the best Helpe is, to stay the *Comming downe* too *Fast*: Whereunto they say, the *Toad-Stone* likewise helpeth. So in *Pestilent Feuers*, the *Intention* is to expell the *Infection* by *Sweat*, and *Euapouration*; But the best *Meanes* to doe it, is by *Nitre*, *Diascordium*, and other *Coole Things*, which doe for a time arrest the *Expulsion*, till *Nature* can doe it more quietly. For as one saith prettily; *In the Quenching of the Flame of a Pestilent Ague, Nature is like People, that come to quench the Fire of a House; which are so busie, as one of them letteth another.* Surely, it is an Excellent *Axiome*, and of Manifold *Vse*, that whatsoeuer appeaseth the *Contention* of the *Spirits*, furthereth their *Action*. 968

The *Writers* of *Naturall Magicke*, commend the Wearing of the *Spoile* of a *Snake*, for *Preseruing* of *Health*. I doubt it is but a *Conceit*; For that the Snake is thought to renue her *Youth*, by Casting her *Spoile*. They might as well take the *Beake* of an *Eagle*, or a Peece of a *Harts-Horne*, because those Renue. 969

It hath beene Anciently *Receiued*, (For *Pericles* the *Athenian* vsed it,) and it is yet in vse, to weare little *Bladders* of *Quick-Siluer*, or *Tablets* of *Arsenicke*, as *Preseruatiues* against the *Plague*: Not as they conceiue, for any *Comfort* they veeld to the *Spirits*, but for that being *Poisons* themselues, they draw the *Venome* to them, from the *Spirits*. 970

Vide the *Experiments* 95. 96. and 97. touching the *Seuerall Sympathies*, and *Antipathies*, for *Medicinall Vse*. 971

972 It is said, that the *Guts* or *Skin* of a *Wolfe* being applied to the *Belly*, doe cure the *Cholicke*. It is true, that the *Wolfe* is a *Beast* of great *Edacity*, and *Digestion*; And so it may bee, the *Parts* of him comfort the *Bowels*.

973 We see *Scare-Crowes*, are set vp to keepe *Birds* from *Corne*, and *Fruit*; It is reported by some, that the *Head* of a *Wolfe*, whole, dried, and hanged vp in a *Dove-House*, will scare away *Vermine*; Such as are *Weasils*, *Polcats*, and the like. It may be, the *Head* of a *Dog* will doe as much; For those *Vermine* with vs, know *Dogs* better than *Wolues*.

974 The *Braines* of some *Creatures* (when their *Heads* are roasted) taken in *Wine*, are said to strengthen the *Memory*: As the *Braines* of *Hares*, *Braines* of *Hens*; *Braines* of *Deeres*, &c. And it seemeth, to bee incident to the *Braines* of those *Creatures*, that are Fearefull.

975 The *Ointment* that *witches* vse, is reported to bee made of the *Fat* of *Children*, digged out of their *Graues*; Of the *Iuices* of *Smallage*, *Wolfe-bane*, and *Cinquefoile*; Mingled with the *Meale* of fine *Wheat*. But I suppose that the *Soporiferous Medicines* are likest to doe it; Which are *Henbane*, *Hemlocke*, *Mandrake*, *Moone-Shade*, *Tobacco*, *Opium*, *Saffron*, *Poplar-Leaues*, &c.

976 It is reported by some, that the *Affections* of *Beasts*, when they are in Strength, doe adde some *Vertue*, vnto *Inanimate Things*; As that the *Skin* of a *Sheepe*, deuoured by a *Wolfe*, moueth *Itching*; That a *Stone* bitten by a *Dog* in Anger, being throwne at him, drunke in *Powder*, prouoketh *Choler*.

977 It hath beene obserued, that the *Diet* of *Women* with *Childe*, doth worke much vpon the *Infant*; As if the *Mother* eat *Quinces* much, and *Coriander-Seed* (the *Nature* of both which is to represse and stay *Vapours*, that ascend to the *Braine*) it will make the *Childe* Ingenious: And on the contrary side, if the *Mother* eat (much) *Onions*, or *Beanes*, or such *Vapourous Food*; Or drinke *Wine*, or *Strong Drinke*, immoderately; Or *Fast* much; Or be giuen to much *Musing*; (All which send, or draw *Vapours* to the *Head*,) It endangereth the *Childe* to become *Lunaticke*, or of *Imperfect Memory*: And I make the same Iudgement of *Tobacco*, often taken by the *Mother*.

978 The *Writers* of *Naturall Magicke* report, that the *Heart* of an *Ape*, worne neere the *Heart*, comforteth the *Heart*, and increaseth *Audacity*. It is true, that the *Ape* is a Merry and Bold *Beast*. And that the same *Heart* likewise of an *Ape*, applied to the *Necke* or *Head*, helpeth the *Wit*; And is good for the *Falling-Sickenesse*: The *Ape* also is a Witty *Beast*, and hath a *Dry Braine*; Which may be some *Cause* of *Attenuation* of *Vapours* in the *Head*. Yet it is said to moue *Dreames* also. It may be, the *Heart* of a *Man* would doe more, but that it is more against *Mens* Mindes to vse it; Except it be in such as were the *Reliques* of *Saints*.

979 The *Flesh* of a *Hedge-Hog*, Dressed and Eaten, is said to be a great *Drier*: It is true, that the *Iuyce* of a *Hedge-Hog*, must needs be *Harsh* and *Dry*, because it putteth forth so many *Prickles*: For *Plants* also, that are full of *Prickles*,

Prickles, are generally Drie: As *Briars*, *Thornes*, *Berberries*: And therefore the *Aſhes* of a *Hedge-Hog* are ſaid to bee a great *Deſiccatiue* of *Fiſtula's*.

Mummy hath great force in *Stanching* of *Bloud*; which, as it may be aſcribed to the *Mixture* of *Balmes*, that are *Glutinous*; So it may alſo partake of a Secret *Propriety*; In that the *Bloud* draweth *Mans Fleſh*. And it is approued, that the *Moſſe* which groweth vpon the *Skull* of a *Dead Man* vnburied, will ſtanch *Bloud* potently. And ſo doe the *Dregs*, or *Powder* of *Bloud*, ſeuered from the *Water*, and *Dried*. 980

It hath beene practiſed, to make *White Swallowes*, by *Annointing* of the *Egges* with *Oyle*. Which *Effect* may be produced, by the *Stopping* of the *Pores* of the *Shell*, and making the *Iuyce*, that putteth forth the *Feathers* afterwards, more Penurious. And it may be, the *Annointing* of the *Egges*, will be as Effectuall as the *Annointing* of the *Body*; Of which *Vide* the *Experiment* 93. 981

It is reported, that the *White* of an *Egge*, or *Bloud*, mingled with *Salt-Water*, doth gather the *Saltneſſe*, and maketh the *Water* ſweeter. This may be by *Adheſion*; As in the 6. *Experiment* of *Clarification*: It may be alſo that *Bloud*, and the *White* of an *Egge*, (which is the *Matter* of a *Liuing Creature*,) haue ſome *Sympathy* with *Salt*: For all *Life* hath a *Sympathy* with *Salt*. We ſee that *Salt*, laid to a *Cut finger*, healeth it; So as it ſeemeth *Salt* draweth *Bloud*, as well as *Bloud* draweth *Salt*. 982

It hath beene anciently receiued, that the *Sea-Hare*, hath an *Antipathy* with the *Lungs*, (if it commeth neare the Body,) and erodeth them. Whereof the *Cauſe* is conceiued to be, a *Quality* it hath of *Heating* the *Breath*, and *Spirits*; As *Cantharides* haue vpon the *Watrie Parts* of the *Body*; As *Vrine* and *Hydropicall Water*. And it is a good *Rule*, that whatſoeuer hath an *Operation* vpon certaine *Kinds* of *Matters*, that, in *Mans Bodie*, worketh moſt vpon thoſe *Parts*, wherein that Kind of *Matter* aboundeth. 983

Generally, that which is *Dead*, or *Corrupted*, or *Excerned*, hath *Antipathie* with the ſame *Thing*, when it is *Aliue*, and when it is *Sound*; And with thoſe *Parts*, which doe *Excerne*: As a *Carkaſſe* of *Man* is moſt *Infectious*, and *Odious* to *Man*; A *Carrion* of an *Horſe* to an *Horſe*, &c. *Purulent Matter* of *Wounds*, and *Vlcers*, *Carbuncles*, *Pockes*, *Scabs*, *Leproſie*, to *Sound Fleſh*; And the *Excrement* of euery *Species* to that *Creature* that *Excerneth* them. But the *Excrements* are leſſe Pernicious than the *Corruptions*. 984

It is a Common *Experience*, that *Dogs* know the *Dog-Killer*, When as in times of *Infection*, ſome Petty *Fellow* is ſent out to kill *Dogs*; And that though they haue neuer ſeene him before, yet they will all come forth, and barke, and fly at him. 985

The *Relations* touching the *Force* of *Imagination*, and the *Secret Inſtincts* of *Nature*, are ſo vncertaine, as they require a great deale of *Examination*, ere we conclude vpon them. I would haue it firſt throughly inquired, whether there be any Secret Paſſages of *Sympathy*, betweene 986

Perſons

Persons of neare Bloud; As *Parents*, *Children*, *Brothers*, *Sisters*, *Nurse-Children*, *Husbands*, *Wiues*, &c. There be many Reports in *History*, that vpon the *Death* of *Persons* of such Neerenesse, *Men* haue had an inward *Feeling* of it. I my Selfe remember, that being in *Paris*, and my *Father* dying in *London*, two or three dayes before my *Fathers* death, I had a *Dreame*, which I told to diuers *English Gentlemen*; That my *Fathers House* in the *Countrey*, was *Plastered* all ouer with *Blacke Mortar*. There is an Opinion abroad, (whether Idle or no I cannot say,) That louing and kinde *Husbands*, haue a *Sense* of their *Wiues Breeding Childe*, by some *Accident* in their owne *Bodie*.

987 Next to those that are *Neare* in *Bloud*, there may be the like *Passage*, and *Instincts* of *Nature*, betweene great *Friends*, and *Enemies*: And sometimes the Reuealing is vnto Another *Person*, and not to the *Party* Himselfe. I remember *Philippus Commineus*, (a graue Writer,) reporteth; That the *Arch-Bishop* of *Vienna*, (a *Reuerend Prelate*,) said (one day) after *Masse*, to *King Lewis* the eleuenth of *France*; *Sir your Mortall Enemie is dead*; What time *Duke Charles* of *Burgundy* was Slaine, at the *Battell* of *Granson*, against the *Switzers*. Some triall also would be made, whether *Pact* or *Agreement* doe any thing; As if two *Friends* should agree, that such a *Day* in euery *Weeke*, they being in farre *Distant Places*, should *Pray* one for Another; Or should put on a *Ring*, or *Tablet*, one for anothers Sake; Whether if one of them should breake their *Vow* and *Promise*, the other should haue any *Feeling* of it, in *Absence*.

988 If there be any *Force* in *Imaginations* and *Affections* of *Singular Persons*; It is Probable the *Force* is much more in the *Ioynt Imaginations* and *Affections* of *Multitudes*: As if a *Victory* should be won, or lost, in *Remote Parts*, whether is there not some *Sense* thereof, in the *People* whom it concerneth; Because of the great *Ioy* or *Griefe*, that many *Men* are possest with, at once? *Pius Quintus*, at the very time, when that Memorable *Victory* was won, by the *Christians*, against the *Turkes*, at the *Nauall Battell* of *Lepanto*, being then hearing of *Causes* in *Consistory*, brake off suddenly, and said to those about him; *It is now more time, we should giue thankes to God, for the great Victory he hath graunted vs against the Turkes*. It is true, that *Victory* had a *Sympathy* with his *Spirit*; For it was meerely his Worke, to conclude that *League*. It may be, that *Reuelation* was *Diuine*; But what shall we say then, to a *Number*, of *Examples*, amongst the *Grecians*, and *Romans*? Where the *People*, being in *Theaters* at *Plaies* haue had Newes of *Victories*, and *Ouerthrowes*, some few dayes, before any *Messenger* could come.

It is true, that that may hold in these Things, which is the generall *Root* of *Superstition*: Namely, that *Men* obserue when *Things Hit*, and not when they *Misse*: And commit to Memory the one, And forget and passe ouer the other. But touching *Diuination*, and the *Misgiuing* of *Mindes*, wee shall

shall speake more, when we handle in generall, the *Nature* of *Minds*, and *Soules*, and *Spirits*.

We haue giuen formerly some *Rules* of *Imagination*; And touching the *Fortifying* of the Same. We haue set downe also some few *Instances*, and *Directions*, of the *Force* of *Imagination*, vpon *Beasts*, *Birds*, &c. vpon *Plants*, And vpon *Inanimate Bodies*: Wherein you must still obserue, that your *Trialls* be vpon *Subtill* and *Light Motions*, and not the contrary; For you will sooner, by *Imagination*, binde a *Bird* from *Singing*, than from *Eating*, or *Flying*, And I leaue it to euery *Man*, to choose *Experiments*, which himselfe thinketh most Commodious; Giuing now but a few *Examples* of euery of the Three Kindes. 989

Vse some *Imaginant*, (obseruing the *Rules* formerly prescribed,) for *Binding* of a *Bird* from *Singing*; And the like of a *Dog* from *Barking*. Trie also the *Imagination* of some, whom you shal accommodate with things to fortifie it, in *Cocke-fights*, to make one *Cocke* more Hardy, and the other more Cowardly. It would be tried also in *Flying* of *Hawkes*; Or in *Coursing* of a *Deere*, or *Hare*, with *Grey-Hounds*; Or in *Horse-Races*; And the like *Comparatiue Motions*: For you may sooner by *Imagination*, quicken or slacke a *Motion*, than raise or cease it; As it is easier to make a *Dog* goe slower, than to make him stand still that he may not runne. 990 991

In *Plants* also, you may trie the *Force* of *Imagination*; vpon the *Lighter* Sort of *Motions*: As vpon the Sudden *Fading*, or Liuely *Comming vp* of *Herbs*; Or vpon their *Bending* one way, or other; Or vpon their *Closing*, and *Opening*; &c.

For *Inanimate Things*, you may trie the *Force* of *Imagination*, vpon Staying the *Working* of *Beere*, when the *Barme* is put in; Or vpon the *Comming* of *Butter*, or *Cheese*, after the *Cherming*, or the *Rennet* bee put in. 992

It is an Ancient *Tradition*, euery where alleaged, for *Example* of *Secret Proprieties* and *Influxes*, that the *Torpedo Marina*, if it be touched with a long Sticke, doth stupefie the *Hand* of him that toucheth it. It is one degree of *Working* at *Distance*, to worke by the Continuance of a Fit *Medium*; As *Sound*, will be conueyed to the *Eare*, by striking vpon a *Bow-String*, if the *Horne* of the *Bow* be held to the *Eare*. 993

The *Writers* of *Naturall Magicke*, doe attribute much to the *Vertues*, that come from the *Parts* of *Liuing Creatures*; So as they be taken from them, the *Creatures* remaining still aliue: As if the *Creature* still liuing did infuse some *Immateriate Vertue*, and *Vigour*, into the *Part Seuered*. So much may be true; that any *Part*, taken from a *Liuing Creature*, newly *Slaine*, may be of greater force, than if it were taken from the like *Creature*, *dying* of it *Selfe*, because it is fuller of *Spirit*. 994

Triall would be made, of the like *Parts* of *Indiuidualls*, in *Plants*, and *Liuing Creatures*; As to cut off a *Stocke* of a *Tree*; And to lay that, which you cut off, to *Putrifie*, to see whether it will Decay the Rest of the *Stocke*: Or if you should cut off part of the *Taile*, or *Legge* of a *Dogge*, 995

or

or a *Cat*, and lay it to *Putrifie*, and so see whether it will *Fester* or keepe from *Healing*, the *Part* which remaineth.

996 It is receiued, that it helpeth to *Continue Loue*, if one weare a *Ring*, or a *Bracelet*, of the *Haire* of the *Party Beloued*. But that may be by the *Exciting* of the *Imagination*: And perhaps a *Gloue*, or other like *Fauour*, may as well doe it.

997 The *Sympathie* of *Indiuidualls*, that haue beene *Entire*, or haue *Touched*, is of all others the most *Incredible*: Yet according vnto our faithfull Manner of *Examination* of *Nature*, we will make some little mention of it. The *Taking away* of *Warts*, by *Rubbing* them with somewhat that afterwards is put to waste, and consume, is a Common *Experiment*: And I doe apprehend it the rather, because of mine owne *Experience*. I had, from my *Childhood*, a *Wart* vpon one of my *Fingers*; Afterwards when I was about Sixteene Yeares old, being then at *Paris*, there grew vpon both my *Hands* a Number of *Warts*, (at the least an hundred,) in a Moneths Space. The *English Embassadours Ladie*, who was a *Woman* farre from *Superstition*, told me, one day; Shee would helpe mee away with my *Warts*: Whereupon shee got a *Peece* of *Lard*, with the *Skin* on; and rubbed the *Warts* all ouer, with the *Fat Side*; And amongst the rest that *Wart*, which I had had from my *Childhood*; Then shee nailed the *Peece* of *Lard*, with the *Fat* towards the *Sunne*, vpon a *Post* of her *Chamber Window*, which was to the *South*. The Successe was, that within fiue weekes space, all the *Warts* went quite away: And that *Wart*, which I had so long endured, for Company. But at the rest I did little maruell, beeause they came in a Short time, and might goe away in a Short, Time againe: But the Going away of that, which had stayed so long doth yet sticke with me. They say the like is done, by the *Rubbing* of *Warts* with a Greene *Elder Sticke*, and then *Burying* the *Sticke* to *Rot* in *Mucke*. It would be tryed, with *Cornes*, and *Wens*, and such other *Excrescences*. I would haue it also tried, with some *Parts* of *Liuing Creatures*, that are neerest the *Nature* of *Excrescences*; As the *Combs* of *Cocks*, the *Spurres* of *Cocks*, the *Hornes* of *Beasts*, &c. And I would haue it tried both waies; Both by *Rubbing* those *Parts* with *Lard* or *Elder*, as before; And by *Putting off* some *Peece* of those *Parts*, and laying it to *Consume*; To see whether it will Worke any Effect, towards the *Consumption* of that *Part* which was once *Ioyned* with it.

998 It is constantly Receiued, and Auouched, that the *Anointing* of the *Weapon*, that maketh the *Wound*, will heale the *Wound* it selfe. In this *Experiment*, vpon the Relation of *Men* of *Credit*, (though my selfe, as yet, I are not fully inclined to beleeue it,) you shall note the *Points* following. First, the *Ointment*, wherewith this is done, is made of Diuers *Ingredients*; whereof the Strangest and Hardest to come by, are the *Mosse* vpon the *Skull* of a *dead Man*, *Vnburied*; And the *Fats* of a *Boare*, and a *Beare*, killed in the *Act* of *Generation*. These two last I could easily suspect to be prescribed as a Starting Hole; That if the *Experiment* proued not, it mought be pretended, that the *Beasts* were not killed in the due Time;

For

For as for the *Mosse*, it is certain, there is great Quantity of it in *Ireland* vpon *Slaine Bodies*, laid on *Heapes*, *Vnburied*. The other *Ingredients* are, the *Blood-Stone* in *Powder*, and some other *Things*, which seem to haue a *Vertue* to *Stanch Blood*; As also the *Mosse* hath. And the *Description* of the *whole Ointment* is to be found in the *Chymical Dispensatory* of *Crollius*. Secondly, the same *Kinde* of *Ointment*, applied to the *Hurt* it selfe, worketh not the *Effect*; but only applied to the *Weapon*. Thirdly, (which I like well) they do not obserue the *Confecting* of the *Ointment* vnder any certaine *Constellation*; which commonly is the Excuse of *Magicall Medicines*, when they faile, that they were not made vnder a fit *Figure* of *Heauen*. Fourthly, it may be applied to the *Weapon*, though the *Party Hurt* be at great *Distance*. Fifthly, it seemeth the *Imagination* of the Party, to be *Cured*, is not needfull to Concurre; For it may be done, without the Knowledge of the *Party wounded*; And thus much hath beene tryed, that the *Ointment* (for *Experiments* sake,) hath beene wiped off the *Weapon*, without the knowledge of the *Partie Hurt*, and presently the *Party Hurt*, hath beene in great *Rage* of *Paine*, till the *Weapon* was *Reanointed*. Sixthly, it is affirmed, that if you cannot get the *Weapon*, yet if you put an *Instrument* of *Iron*, or *wood*, resembling the *Weapon*, into the *Wound*, when by it bleedeth, the *Anointing* of that *Instrument* will serue, and worke the *Effect*. This I doubt should be a Deuice, to keep this strange *Forme* of *Cure*, in Request, and Vse; Because many times you cannot come by the *Weapon* it selfe. Seuenthly, the *Wound* must be at first *Washed cleane*, with *White Wine*, or the *Parties* owne *Water*; And then bound vp close in *Fine Linnen*, and no more *Dressing* renewed; till it be *whole*. Eightly, the *Sword* it selfe must be *Wrapped* vp *Close*, as farre as the *Ointment* goeth, that it taketh no *Wind*. Ninthly, the *Ointment*, if you *wipe* it off from the *Sword*, and keepe it, will *Serue againe*; and rather *Increase* in *vertue*, than *Diminish*. Tenthly, it will *Cure* in farre *Shorter Time*, than *Ointments* of *Wounds* commonly doe. Lastly, it will *Cure* a *Beast*, as well as a *Man*, which I like best of all the rest, because it subiecteth the *Matter*, to an *Easie Triall*.

I Would haue *Men* know, that though I reprehend, the *Easie Passing ouer*, of the *Causes* of *Things*, by Ascribing them to *Secret* and *Hidden Vertues*, and *Proprieties*;) For this hath arrested, and laid asleepe, all true *Enquiry*, and *Indications*;) yet I doe not vnderstand, but that in the *Practicall Part* of *Knowledge*, much will be left to *Experience*, and *Probation*, whereunto *Indication* cannot so fully reach: And this not onely in *Specie*, but in *Individuo*. So in *Physicke*, if you will cure the *Iaundies*, it is not enough to say, that the *Medicine* must not be Cooling; For that wil hinder the *Opening* which the *Disease* requireth: That it must not be *Hot* For that will exasperate *Choler*: That it must goe to the *Gall*; For there is the *Obstruction* which causeth the *Disease*, &c. But you must receiue from *Experience*, that *Powder* of *Chamæpytis*, or the like, drunke in *Beere*, is good for the *Iaundies*: So againe, a wise *Phisitian* doth not continue still

Experiment Solitary, touching *Secret Proprieties*. 999

ſtill the ſame *Medicine*, to a *Patient*; But he will vary, if the firſt *Medicine* doth not apparantly ſucceed: For of thoſe *Remedies*, that are good for the *Laundies*, *Stone*, *Agues*, &c. that will do good in one *Body*; which will not doe good in Another; According to the Correſpondence the *Medicine* hath to the *Individuall Bodie*.

Experiment Solitary, touching the *Generall Sympathy* of *Mens Spirits*. 1000

THe *Delight* which *Men* haue in *Popularitie*, *Fame*, *Honour*, *Submiſſion*, & *Subiection* of other *Mens Minds*, *Wils*, or *Affections*, (although theſe *Things* may be deſired for other *Ends*) ſeemeth to be a *Thing*, in it ſelfe, without Contemplation of Conſequence, Gratefull and agreeable to the *Nature* of *Man*. This Thing (ſurely) is not without ſome Signification, as if all *Spirits* and *Soules* of *Men*, came forth out of one *Diuine Limbus*; Elſe why ſhould *Men* be ſo much affected with that, which others thinke, or ſay? The beſt Temper of *Mindes* deſireth *Good Name*, and *True Honour*: The Lighter, *Popularity*, and *Applauſe*; The more depraued, *Subiection*, and *Tyranny*; As is ſeene in great *Conquerours*, and *Troublers* of the *World*: And yet more in *Arch-Heretikes*; for the Introducing of new *Doctrines*, is likewiſe an *Affectation* of *Tyrannie*, ouer the *Vnderſtandings*, and *Beleefes* of *Men*.

A TABLE OF the Experiments.

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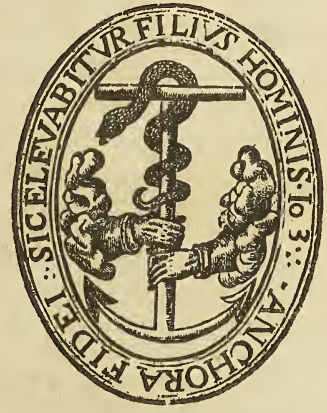
FINIS.

NEW ATLANTIS.

A Worke vnfinished.

Written by the Right Honourable, FRANCIS *Lord Verulam, Viſcount S^t. Alban.*



To the Reader.

THis *Fable* my *Lord* deuiſed, to the end that Hee might exhibit therein, a *Modell* or *Deſcription* of a *College*, inſtituted for the *Interpreting* of *Nature*, and the Producing of *Great* and *Maruellous Workes*, for the *Benefit* of *Men*; Vnder the Name of *Salomons Houſe*, or the *College of the Six Dayes Works*. And euen ſo farre his *Lordſhip* hath proceeded, as to finiſh that Part. Certainly the Modell is more Vaſt, and High, than can poſsibly be imitated in all things; Notwithſtanding moſt Things therein are within Mens Power to effect. His *Lordſhip* thought alſo in this preſent *Fable*, to haue compoſed a *Frame* of *Lawes*, or of the *beſt State* or *Mould* of a *Common-wealth*; But fore-ſeeing it would bee a long Worke, his Deſire of Collecting the *Naturall Hiſtorie* diuerted him, which He preferred many degrees before it.

This Worke of the *New Atlantis* (as

much as concerneth the *Englifh Edition*) his *Lordſhip* deſigned for this place ; In regard it hath ſo neare Affinity (in one part of it) with the Preceding *Naturall Hiſtory*.

W. Rawley.

NEW ATLANTIS.

WE sailed from *Peru*, (where wee had continued by the space of one whole yeare,) for *China* and *Iapan*, by the South Sea; taking with vs Victuals for twelue Moneths; And had good Winds from the East, though soft and weake, for fiue Moneths space and more. But then the Wind came about, and setled in the West for many dayes, so as we could make little or no way, and were sometimes in purpose to turne backe. But then againe there arose Strong and Great Winds from the South, with a Point East; which carried vs vp, (for all that we could doe) towards the North: By which time our Victuals failed vs, though wee had made good spare of them. So that finding our selues, in the Midst of the greatest Wildernesse of Waters in the World, without Victuall, wee gaue our Selues for lost Men, and prepared for death. Yet we did lift vp our Hearts and Voices to GOD aboue, *who sheweth his Wonders in the Deepe*; Beseeching him of his Mercy, that as in the *Beginning* Hee discouered the *Face* of the *Deepe*, and brought forth *Drie-Land*; So he would now discouer Land to vs, that we mought not perish. And it came to passe, that the next Day about Euening, we saw within a Kenning before vs, towards the North, as it were thicke-Clouds, which did put vs in some hope of Land; Knowing how that part of the South-Sea was vtterly vnknowne; And might haue Islands or Continents, that hitherto were not come to light. Wherefore we bent our course thither, where wee saw the Appea-

rance of Land, all that night; And in the Dawning of the next Day, wee might plainly discerne that it was a Land, Flat to our sight, and full of Boscage; which made it shew the more Darke. And after an Houre and a halfes Sayling, wee entred into a good *Hauen*, being the Port of a faire *City*; Not great indeed, but well built, and that gaue a pleasant view from the Sea: And wee thinking euery Minute long, till wee were on Land, came close to the Shore, and offered to land. But straight wayes wee saw diuers of the People, with Bastons in their Hands, (as it were) forbidding vs to land; Yet without any Cryes or Fiercenesse, but onely as warning vs off, by Signes that they made. Whereupon being not a little discomforted, wee were aduising with our selues, what wee should doe. During which time, there made forth to vs a small Boat, with about eight Persons in it; whereof One of them had in his Hand a Tipstaffe of a yellow Cane, tipped at both ends with Blew, who made aboard our Ship, without any shew of Distrust at all. And when he saw one of our Number, present himselfe somewhat afore the rest, hee drew forth a little Scroule of Parchment (somewhat yellower than our Parchment, and shining like the Leaues of Writing Tables, but otherwise soft and flexible,) and deliuered it to our formost Man. In which Scroule were written in Ancient *Hebrew*, and in Ancient *Greeke*, and in good *Latine* of the Schoole, and in *Spanish*, these words; *Land yee not, none of you, and prouide to be gone, from this Coast, within sixteene dayes, except you haue further time giuen you: Meane-while, if you want Fresh Water, or Victuall, or helpe for your Sicke, or that your Ship needeth repaire, write downe your wants, and you shall haue that which belongeth to Mercy.* This Scroule was signed with a Stampe of *Cherubins Wings*, not spred, but hanging downewards; And by them a *Crosse*. This being deliuered, the *Officer* returned, and left onely a Seruant with vs to receiue our Answer. Consulting hereupon amongst our Selues, wee were much perplexed. The Deniall of Landing, and Hasty Warning vs away, troubled vs much; On the other side, to finde that the People had Languages, and were so full of Humanity, did comfort vs not a little. And aboue

boue all the Signe of the *Crosse* to that Instrument, was to vs a great Reioycing, and as it were a certaine Presage of Good. Our Answer was in the *Spanish* tongue; *That for our Ship, it was well; For we had rather met with Calmes and contrary winds, than any Tempests. For our Sicke, they were many, and in very ill Case; So that if they were not permitted to Land, they ran danger of their Liues.* Our other Wants wee set downe in particular, adding; *That we had some little store of Merchandize, which if it pleased them to deale for, it might supply our Wants, without being chargeable vnto them.* We offered some Reward in Pistolets vnto the Seruant, and a peece of Crimson Veluet to be presented to the *Officer:* But the Seruant tooke them not, nor would scarce looke vpon them; And so left vs, and went backe in another little Boat which was sent for him.

About three Houres after we had dispatched our Answer, there came towards vs, a Person (as it seemed) of place. He had on him a Gowne with wide Sleeues, of a kinde of Water Chamolet, of an excellent Azure Colour, farre more glossy than ours: His vnder Apparell was greene; And so was his Hat, being in the forme of a Turban, daintily made, and not so huge as the *Turkish* Turbans; And the Lockes of his Haire came downe below the Brimmes of it. A Reuerend Man was he to behold. Hee came in a Boat, gilt in some part of it, with foure Persons more onely in that Boat; And was followed by another Boat, wherein were some Twenty. When hee was come within a Flight-shot of our Ship, Signes were made to vs, that wee should send forth some to meet him vpon the Water, which wee presently did in our Ship-Boat, sending the principall Man amongst vs saue one, and foure of our Number with him. When wee were come within six yards of their Boat, they called to vs to stay, and not to approach further, which wee did. And thereupon the Man, whom I before described, stood vp, and with a loud voice, in *Spanish*, asked, *Are yee Christians?* Wee answered; *Wee were;* fearing the lesse, because of the *Crosse* we had seene in the Subscription. At which Answer the said Person lift vp his Right Hand towards Heauen, and drew it softly

to

to his Mouth (which is the Gesture they vse, when they thanke GOD;) And then said: *If yee will sweare, (all of you,) by the Merits of the* SAVIOVR, *that ye are no Pirates; Nor haue shed bloud, lawfully, nor vnlawfully, within forty dayes past; you may haue License to come on Land.* We said; *We were all ready to take that Oath.* Whereupon one of those that were with him, being (as it seemed) a *Notarie*, made an Entry of this Act. Which done, another of the Attendants of the Great Person, which was with him in the same Boat, after his Lord had spoken a little to him, said aloud; *My Lord would haue you know, that it is not of Pride, or Greatnesse, that he commeth not aboard your Ships; But for that, in your Answer, you declare, that you haue many Sicke amongst you, he was warned by the* Conseruator *of* Health, *of the* City, *that hee should keepe a distance.* Wee bowed our selues towards him, and answered; *Wee were his humble Seruants; And accounted for great Honour, and singular Humanity towards vs, that which was already done; But hoped well, that the Nature, of the Sickenesse, of our Men, was not infectious.* So he returned; And a while after came the *Notary* to vs aboard our Ship; Holding in his hand a Fruit of that Country, like an Orenge, but of colour betweene Orenge-tawney and Scarlet; which cast a most excellent Odour. He vsed it (as it seemeth) for a Preseruatiue against Infection. He gaue vs our Oath; *By the Name of Iesus, and his Merits:* And after told vs, that the next day by six of the Clocke in the Morning, we should bee sent to, and brought to the *Strangers House*, (so hee called it,) where we should be acommodated of things, both for our whole, and for our Sicke. So he left vs; And when we offered him some Pistolets, he smiling, said; *Hee must not bee twice paid for one Labour*: Meaning (as I take it) that he had Salary sufficient of the *State* for his Seruice. For (as I after learned) they call an Officer that taketh Rewards, *Twice-paid.*

The next Morning early, there came to vs the same *Officer*, that came to vs at first with his Cane, and told vs; *Hee came to conduct vs to the* Strangers House; *And that he had preuented the Houre, because we might haue the whole day before vs, for our Businesse. For* (said he) *If you will follow my Aduice, there shall first*

goe

goe with me some few of you, & see the place, and how it may be made conuenient for you; And then you may send for your Sick, and the rest of your Number; which yee will bring on Land. Wee thanked him, and said; *That this Care, which he tooke of desolate Strangers,* GOD *would reward.* And so sixe of vs went on Land with him: And when wee were on Land, hee went before vs, and turned to vs, and said; *Hee was but our Seruant, and our Guide.* Hee led vs through three faire Streets; And all the Way we went, there were gathered some People on both sides, standing in a Row; But in so ciuill a fashion, as if it had beene, not to wonder at vs, but to welcome vs: And diuers of them, as wee passed by them, put their Armes a little abroad; which is their Gesture, when they bid any welcome. The *Strangers House* is a faire and spacious House, built of Brick, of somewhat a blewer Colour than our Brick, And with handsome Windowes, some of Glasse, some of a kinde of Cambrick oyl'd. Hee brought vs first into a faire Parlour aboue staires, and then asked vs, *What number of Persons we were? And how many sick?* we answered, *Wee were in all, (sick and whole) one and fifty Persons, whereof four sick were seuenteene.* Hee desired vs to haue patience a little, and to stay till he came backe to vs; which was about an Houre after; And then hee led vs to see the Chambers, which were prouided for vs, being in number nineteene. They hauing cast it (as it seemeth) that foure of those Chambers, which were better then the rest, might receiue foure of the principall Men of our Company; And lodge them alone by themselues; And the other 15. Chambers were to lodge vs, two and two together. The Chambers were handsome and chearefull Chambers, and furnished ciuilly. Then hee led vs to a long Gallery, like a Dorture, where hee shewed vs all along the one side (for the other side was but wall and window,) seuenteene Cells, very neat ones, hauing partitions of Cedar wood. Which Gallery, and Cells, being in all forty, (many more then we needed,) were instituted as an Infirmary for sick Persons. And hee told vs withall, that as any of our Sick waxed well, hee might be remoued from his Cell, to a Chamber: For which purpose, there were set forth ten

ſpare Chambers, beſides the Number wee ſpake of before. This done, hee brought vs backe to the Parlour, and lifting vp his Cane a little, (as they doe when they giue any Charge or Command) ſaid to vs; *Yee are to know that the Cuſtome of the Land requireth, that after this day, and to morrow, (which we giue you for remouing of your people from your Shipp,) you are to keepe within doores for three dayes. But let it not trouble you, nor doe not thinke your ſelues reſtrained, but rather left to your Reſt and Eaſe. You ſhall want nothing, and there are ſix of our People appointed to attend you, for any Buſineſſe you may haue abroad.* We gaue him thankes, with all Affection and Reſpect, and ſaid; God *ſurely is manifeſted in this Land.* Wee offered him alſo twenty Piſtolets; But he ſmiled, and onely ſaid; *What? Twice paid!* And ſo hee left vs. Soone after our Dinner was ſerued in; Which was right good Viands, both for Bread, and Meat: Better than any *Collegiate* Diet, that I haue knowne in *Europe.* Wee had alſo Drinke of three ſorts, all wholeſome and good; Wine of the Grape; A Drinke of Graine, ſuch as is with vs our Ale, but more cleare: And a kinde of Sider made of a fruit of that Countrey; A wonderfull pleaſing and Refreſhing Drinke. Beſides, there were brought in to vs, great ſtore of thoſe Scarlet Orenges, for our Sicke; which (they ſaid) were an aſſured Remedy for ſickneſſe taken at Sea. There was giuen vs alſo, a Box of ſmall gray, or whitiſh Pils, which they wiſhed our Sicke ſhould take, one of the Pills euery night before ſleepe; which (they ſaid) would haſten their Recouery. The next day, after that our Trouble of Carriage, and Remouing of our Men, and Goods out of our Shipp, was ſomewhat ſetled and quiet, I thought good to call our Company together; and when they were aſſembled, ſaid vnto them; *My deare Friends; Let vs know our ſelues, and how it ſtandeth with vs. We are Men caſt on Land, as* Ionas *was, out of the* Whales Belly, *when wee were as buried in the Deepe: And now wee are on Land, wee are but betweene Death and Life; For we are beyond both the Old World and the New; And whether euer wee ſhall ſee* Europe, God *onely knoweth. It is a kinde of Miracle hath brought vs hither: And it muſt bee little leſſe, that ſhall bring vs hence. Therfore in regard of our Deliuerance paſt, and*

our

our danger present, and to come, let vs looke vp to GOD, *and euery man reforme his owne wayes. Besides we are come here amongst a* Christian People, *full of Piety and Humanity: Let vs not bring that Confusion of face vpon our selues, as to shew our vices, or vnworthinesse before them: Yet there is more. For they haue by Commandement, (though in forme of Courtesie) Cloistred vs within these Walls, for three dayes: Who knoweth, whether it be not, to take some tast of our manners and conditions? And if they finde them bad, to banish vs streight-wayes; if good, to giue vs further time. For these Men, that they haue giuen vs for Attendance, may withall haue an eye vpon vs Therefore for* GODS *loue, and as we loue the weale of our Soules and Bodies, let vs so behaue our selues, as we may be at peace with* GOD, *and may finde grace in the Eyes of this People.* Our Company with one voice thanked me for my good Admonition, and promised me to liue soberly and ciuilly, and without giuing any the least occasion of Offence. So we spent our three dayes ioyfully, and without care, in expectation what would be done with vs, when they were expired. During which time, wee had euery houre ioy of the Amendment of our Sick; who thought themselues cast into some Diuine *Poole* of *Healing*; They mended so kindely, and so fast.

The Morow after our three dayes were past, there came to vs a new Man, that we had not seene before, clothed in Blew as the former was, saue that his Turban was white with a small red Crosse on the Topp. He had also a Tippet of fine Linnen. At his Comming in, he did bend to vs a little, and put his Armes abroad. Wee of our Parts saluted him in a very lowly and submissiue manner; As looking that from him, wee should receiue Sentence of Life, or Death. Hee desired to speake With some few of vs: Whereupon six of vs onely stayed, and the rest auoyded the Roome. He said; *I am by Office Gouernour of this House of Strangers, & by Vocation I am a* Christian Priest; *And therefore am come to you, to offer you my seruice, both as Strangers, and chiefly as* Christians. *Some things I may tell you, which I thinke you will not be vnwilling to heare. The State hath giuen you Licence to stay on Land for the space of six weekes: And let it not trouble you, if your occasions aske further time, for the Law in*

this point is not precise; And I doe not doubt, but my selfe shall be able to obtaine for you, such further time, as may be conuenient. Ye shall also vnderstand, that the Strangers House, *is at this time Rich, and much aforehand; For it hath laid vp Reuenew these* 37. *yeares: For so long it is, since any Stranger arriued in this part: And therfore take yee no care, The* State *will defray you all the time you stay: Neither shall you stay one day the lesse for that. As for any Merchandize ye haue brought, ye shall be well vsed, and haue your returne, either in Merchandize, or in Gold and Siluer: For to vs it is all one. And if you haue any other Request to make, hide it not. For yee shall finde, wee will not make your Countenance to fall, by the answer ye shall receiue. Onely this I must tell you, that none of you must goe aboue a* Karan, (that is with them a Mile and an halfe) *from the walles of the Citty, without especiall leaue.* We answered, after we had looked a while vpon one another, admiring this gracious and parent like vsage; *That wee could not tell what to say: For wee wanted words to expresse our Thanks; And his Noble free Offers left vs nothing to aske. It seemed to vs, that we had before vs a picture of our* Saluation *in* Heauen *: For we that were a while since in the Iawes of Death, were now brought into a place, where we found nothing but Consolations. For the Commandement layd vpon vs, wee would not faile to obey it, though it was impossible; but our Hearts should be enflamed to tread further vpon this Happy and Holy Ground.* Wee added; *That our Tongues should first cleaue to the Roofes of our Mouthes, ere we should forget, either his Reuerend Person, or this whole Nation, in our Prayers.* Wee also most humbly besought him to accept of vs as his true seruants, by as iust a Right, as euer Men on Earth were bounden; laying and presenting, both our Persons, and all we had at his feete. Hee said; *He was a Priest, and looked for a Priests reward; which was our Brotherly loue, and the Good of our Soules and Bodies.* So he went from vs, not without teares of Tendernesse in his Eyes; And left vs also confused with ioy and kindnesse, saying amongst our selues; *That wee were come into a Land of Angells, which did appeare to vs dayly, and preuent vs with Comforts, which we thought not of, much lesse expected.*

The next day about 10. of the Clocke, the Gouernour came

came to vs againe, and after Salutations, said familiarly; *That he was come to visit vs*, And called for a Chaire, and sat him downe; And wee being some 10. of vs (the rest were of the meaner sort; or else gone abroad;) sat downe with him, And When wee were sett, he began thus. *Wee of this Island of Bensalem* (for so they call it in their Language) *haue this; That by meanes of our solitary Situation; and of the Lawes of Secrecy, which wee haue for our Trauellers and our rare Admission of Strangers; wee know well most part of the Habitable World, and are our selues vnknowne Therefore because hee that knoweth least, is fittest to aske Questions, it is more Reason, for the Entertainment of the time, that yee aske me Questions, than that I aske you.* Wee answered; *That wee humbly thanked him, that he would giue vs leaue so to doe: And that we conceiued by the taste wee had already, that there was no worldly thing on Earth, more worthy to be knowne, than the State of that happy Land. But aboue all* (wee said) *since that we were mett from the seuerall Ends of the world; and hoped assuredly, that wee should meet one day in the* Kingdome *of* Heauen (*for that wee were both Parts* Christians) *we desired to know* (*in respect that Land was so remote, and so diuided by vast and vnknowne Seas, from the Land, wher our* Saviour *walked on Earth*) *who was the* Apostle *of that Nation, and how it was conuerted to the faith?* It appeared in his face, that he tooke great Contentment in this our Question: Hee said; *Ye knit my Heart to you, by asking this Question in the first place; For it sheweth that you* First seeke the Kingdome of Heauen; *And I shall gladly, and briefly, satisfie your demand.*

About twenty Yeares after the Ascention of our Saviour, *it came to passe, that there was seene by the people of* Renfusa, (*a City vpon the Easterne Coast of our Island,*) *within Night,* (*the Night was Cloudy and Calme,*) *as it might be some mile into the Sea, a great Pillar of Light, Not sharp, but in forme of a Columne, or* Cylinder, *rising from the Sea, a great way vp towards Heauen; and on the topp of it was seene a large Crosse of Light, more bright and resplendent than the Body of the Pillar. Vpon which so strange a Spectacle, the People of the City gathered a pace together vpon the Sands, to wonder; And so after put themselues into a number of small Boats to goe*

nearer to this Marueilous sight. But when the Boats were come within (about) 60. yards of the Pillar, they found themselues all bound, and could goe no further, yet so as they might moue to goe about, but might not aproach nearer: So as the Boats stood all as in a Theater, beholding this Light, as an Heauenly Signe. It so fell out, that there was in one of the Boates, one of the Wise Men, of the Society of Salomons House; *which* House *or,* Colledge (*my good Brethren*) *is the very Eye of this Kingdome; Who hauing a while attentiuely and deuoutly viewed, and contemplated this Pillar, and Croße, fell downe vpon his face; And then raised himsefe vpon his knees, and lifting vp his Hands to Heauen, made his prayers in this manner.*

LOrd God *of Heauen and Earth; thou hast vouchsafed of thy Grace, to those of our* Order, *to know thy Workes of Creation, and the Secrets of them; And to discerne (as farre as appertaineth to the Generations of Men) betweene Diuine Miracles, Works of Nature, Works of Art, and Impostures, and Illusions of all sorts. I doe here acknowledge and testifie before this People, that the Thing which wee now see before our eyes, is thy* Finger, *and a true* Miracle. *And for-as-much, as we learne in our Bookes, that thou neuer Workest Miracles, but to a Diuine and Excellent End, (for the Lawes of Nature are thine owne Lawes, and thou exceedest them not but vpon great cause) wee most humbly beseech thee to prosper this great Signe, And to giue vs the Interpretation and vse of it in Mercy; Which thou doest in some part secretly promise, by sending it vnto vs.*

When hee made his Prayer, hee presently found the Boate hee was in, moueable & vnbound; where as all the rest remained still fast; And taking that for an assurance of Leaue to aproach, hee caused the Boate

Boat to be softly, and with silence rowed towards the Pillar. But ere he came neere it, the Pillar and Crosse of Light brake vp, and cast it selfe abroad, as it were, into a Firmament of many Starres; which also vanished soone after, and there was nothing left to be seen, but a small Arke, or Chest of Cedar, dry, and not wet at all with water, though it swam. And in the Fore-end of it, which was towards him, grew a small greene Branch of Palme; And when the wise man had taken it with all reuerence, into his Boat, it opened of it selfe, and there were found in it, a Booke, and a Letter; Both written in fine Parchment, and wrapped in Sindons of Linnen. The Booke conteined all the Canonicall Books of the Old and New Testament, according as you haue them; (For we know well what the Churches with you receiue;) And the Apocalypse it selfe; And some other Bookes of the New Testament, which were not at that time written, were neuertheless in the Booke. And for the Letter, it was in these words.

I Bartholomew, *a Seruant of the Highest, and Apostle of* Iesvs Christ, *was warned by an Angell that appeared to mee, in a vision of Glory, that I should commit this* Arke *to the flouds of the Sea. Therefore I doe testifie and declare, vnto that People, where* God *shall ordaine this* Arke *to come to Land, that in the same day is come vnto them Saluation, and Peace, and Good Will, from the* Father, *and from the* Lord Iesvs.

There was also in both these writings, as well the Booke, as the Letter, wrought a great Miracle, Conforme to that of the Apostles, in the Originall Gift of Tongues. For there being at that time, in this Land, Hebrewes, Persians, and Indians, besides the Natiues, euery one read vpon the Booke, and Letter, as if they had been written in his owne Language. And thus was this Land saued from infidelity, (as the Remaine of the Old World was from Water) by an Arke, through the Apostolicall and Miraculous Euangelisme of S. Bartholomew. And here hee pausèd, and a Messenger came, and

and called him forth from vs. So this was all that passed in that Conference.

The next Day, the same Gouernor came againe to vs, immediately after Dinner, and excused himselfe, saying; *That the Day before, he was called from vs, somewhat abruptly, but now he would make vs amends, and spend time with vs, if wee held his Company, and Conference agreable.* Wee answered; *That wee held it so agreable and pleasing to vs, as wee forgot both Dangers past and Feares to come, for the time wee heard him speake; And that wee thought an Houre spent with him, was worth Yeares of our former life.* He bowed himselfe a little to vs, and after we were set againe hee said; *Well, the Questions are on your part.* One of our Number said after a little Pause; *That there was a Matter, wee were no lesse desirous to know, than fearefull to aske, least wee might presume too farre. But encouraged by his rare Humanity towards vs, (that could scarce thinke our selues Strangers, being his vowed and professed Seruants,) wee would take the Hardines to propound it: Humbly beseeching him, if hee thought it not fit to be answered, that hee would pardon it, though he reiected it.* We said; *We well obserued those his words, which he formerly spake, that this happy Island, where wee now stood, was knowne to few, and yet knew most of the Nations of the World; which we found to be true, considering they had the Languages of* Europe, *and knew much of our State and Busines; And yet we in* Europe, *(not withstanding all the remote Discoueries, and Nauigations of this last Age) neuer heard any of the least Inkling or Glimse of this Island. This wee found wonderfull strange; For that all Nations haue Enterknowledge one of another, either by Voyage into Forreine Parts, or by Strangers that come to them: And though the Traueller into a Forreine Countrey, doth commonly know more by the Eye, than he that stayeth at home can by relation of the Traueller; Yet both wayes suffice to make a mutuall Knowledge, in some degree, on both parts. But for this Island, wee neuer heard tell of any Shipp of theirs, that had been seene to arriue vpon any shore of* Europe; *No, nor of either the* East *or* West Indies, *nor yet of any Shipp of any other part of the World, that had made returne from them. And yet the Maruell rested not in this. For the Situation of it (as his Lordship said,) in the secret Conclaue of such a vast Sea*

mought

mought cause it. But then, that they should haue Knowledge of the Languages, Bookes, Affaires, of those that lye such a distance from them, it was a thing wee could not tell what to make of; For that it seemed to vs a condition and Propriety of Diuine Powers and Beings, to bee hidden and vnseene to others, and yet to haue others open, and as in a light to them. At this speech the Gouernour gaue a gracious smile and said; That wee did well to aske pardon for this Question wee now asked; For it imported, as if wee thought this Land, a Land of Magicians, that sent forth Spirits of the Ayre into all parts, to bring them Newes, and Intelligence of other Countries. It was answered by vs all, in all possible humblenes, but yet with a Countenance taking knowledge, that wee knew that he spake it but merrily; That wee were apt enough to thinke, there was somewhat supernaturall in this Island, but yet rather as Angelicall than Magicall. But to let his Lordship knowe truly, what it was, that made vs tender and doubtfull to aske this Question, it was not any such conceit, but because we remembred, hee had giuen a Touch in his former Speech, that this Land had Lawes of Secrecy touching Strangers. To this he said, You remember it aright: And therefore in that I shall say to you, I must reserue some particulars, which it is not lawfull for me to reueale; but there will be enough left, to giue you satisfaction.

You shall vnderstand (that which perhaps you will scarce thinke credible) that about three thousand Yeares agoe, or somewhat more, the Nauigation of the World (specially for remote Voyages) was greater than at this Day. Doe not thinke with your selues, that I know not how much it is encreased with you, within these three score Yeares: I know it well; And yet I say, greater then, than now: Whether it was, that the Example of the Ark, that saued the Remnant of Men, from the vniuersall Deluge, gaue Men confidence to aduenture vpon the Waters; Or what it was; but such is the truth. The Phœnicians, and specially the Tyrians, had great Fleets. So had the Carthaginians their Colony, which is yet further West Toward the East the Shipping of Egipt, and of Palestina was likwise great. China also, and the great Atlantis, (that you call America) which haue now but Iunks, and Canoa's, abounded then in tall Ships. This Island, (as appeareth by faithfull Registers of those times) had then fifteene

hundred ſtrong Ships, of great content. Of all this, there is with you ſparing Memory, or none, But wee haue large Knowledge thereof.

At that time, this Land was knowne and frequented by the Ships and Veſſels of all the Nations before named. And (as it commeth to paſſe) they had many times Men of other Countries, that were no Saylers, that came with them; As Perſians, Chaldeans, Arabians; So as almoſt all Nations of Might and Fame reſorted hither; Of whom, we haue ſome Stirps, and little Tribes with vs; at this day. And for our owne Ships, they went ſundry Voyages, as well to your Streights, which you call the Pillars of Hercules, As to other parts in the Atlantique and Mediterrane Seas; As to Paguin, (which is the ſame with Cambalaine) and Quinzy, vpon the Orientall Seas, as farre as to the Borders of the Eaſt Tartary.

At the ſame time, and an Age after, or more, the Inhabitants of the great Atlantis did flouriſh. For though the Narration and Deſcription which is made by a great Man with you, that the Deſcendents of Neptune planted there; and of the Magnificent Temple, Pallace, City, and Hill; and the manifold ſtreames of goodly Nauigable Riuers, (which as ſo many Chaines enuironed the ſame Site, and Temple; And the ſeuerall Degrees of Aſcent, whereby Men did climb vp to the ſame, as if it had bin a Scala Cæli; be all Poeticall and Fabulous: Yet ſo much is true, that the ſaid Countrey of Atlantis; As well that of Peru then called Coya, as that of Mexico then named Tyrambel, were mighty and proud Kingdomes, in Armes, Shipping, and Riches: So mighty, as at one time, (or at leaſt within the ſpace of 10. Yeares,) they both made two great Expeditions; They of Tirambel thorow the Atlantique to the Mediterrane Sea; and they of Coya thorow the South Sea vpon this our Iſland: And for the former of theſe, which was into Europe, the ſame Authour amongſt you, (as it ſeemeth,) had ſome relation from the Egyptian Prieſt, whom he citeth. For aſſuredly ſuch a thing there was. But whether it were the Ancient Athenians, that had the glory of the Repulſe, and Reſiſtance of thoſe Forces, I can ſay nothing: But certaine it is there neuer came backe, either Ship, or Man, from that Voyage. Neither had the other Voyage of thoſe of Coya vpon vs, had better fortune if they had not met with Enemies of greater clemency. For the King of this Iſland, (by name Altabin,) a wiſe Man, and a great Warrier;

Warrier; Knowing well both his owne strength, and that of his Enemies; handled the matter so, as hee cut off their Land-Forces, from their Ships; and entoyled both their Nauy, and their Campe, with a greater Power than theirs, both by Sea & Land: And compelled them to render themselues without striking stroke: And after they were at his Mercy, contenting himselfe only with their Oath, that they should no more beare Armes against him, dismissed them all in safety. But the Diuine Reuenge *ouertooke not long after those proud Enterprises. For within lesse than the space of one Hundred Yeares, the* Great Atlantis *was vtterly lost and destroyed: Not by a great Earthquake, as your* Man *saith; (For that whole Tract is little subiect to Earthquakes;) But by a particular Deluge or Inundation; Those Countries hauing, at this Day, farre greater Riuers, and farre higher Mountaines to powre downe waters, than any part of the Old World. But it is true, that the same Inundation was not deepe; Not past forty foot, in most places, from the Ground; So that although it destroyed Man and Beast generally, yet some few wild Inhabitants of the Wood escaped. Birds also were saued by flying to the high Trees & Woods. For as for Men, although they had Buildings in many places, higher than the Depth of the Water; Yet that Inundation, though it were shallow, had a long Continuance; whereby they of the Vale, that were not drowned, perished for want of Food, and other things necessary. So as maruaile you not at the thin Population of* America, *nor at the Rudenesse and Ignorance of the People; For you must account your Inhabitants of* America *as a young People; Younger a thousand years, at the least, than the rest of the World: For that there was so much time, betweene the* Vniuersall Floud, *and their* Particular Inundation. *For the poore Remnant of Humane Seed, which remained in their Mountaines, Peopled the Country againe slowly, by little and little; And being simple and sauage People, (Not like* Noah *and his* Sonnes, *which was the chiefe Family of the Earth) they were not able to leaue Letters, Arts, and Ciuility, to their Posterity; And hauing likewise in their Montanous Habitations beene vsed, (in respect of the extreme Cold of those* Regions,) *to cloath themselues with the Skinnes of Tygers, Beares, and great Hairy Goats, that they haue in those Parts; When after they came downe into the Valley, and found the*

Intolerable Heats which are there, and knew no meanes of lighter Apparell : They were forced to begin the Custome of Going Naked, which continueth at this Day. Onely they take great pride and delight, in the Feathers of Birds ; And this also they tooke from those their Auncestors of the Mountaines, who were inuited vnto it, by the infinite Flights of Birds, that came vp to the high Grounds, while the Waters stood below. So you see, by this maine Accident of Time, wee lost our Trafficke with the Americans, *with whom, of all others, in regard they lay neareſt to vs, we had most Commerce. As for the other Parts of the World, it is most manifest, that in the Ages following, (whether it were in respect of Warres, or by a naturall Reuolution of Time,) Nauigation did euery where greatly decay ; And specially farre Voyages, (the rather by the vse of Gallies, and such Vessels as could hardly brooke the Ocean,) were altogether left and omitted. So then, that part of Entercourse, which could bee from other Nations, to Sayle to vs, you see how it hath long since ceased ; Except it were by some rare Accident, as this of yours. But now of the Cessation of that other Part of Entercourse, which mought be by our Sayling to other Nations, I must yeeld you some other Cause. For I cannot say, (if I shall say truly,) but our Shipping, for Number, Strength, Marriners, Pylots, and all things that appertaine to Nauigation, is as great as euer ; And therefore why we should sit at home, I shall now giue you an account by it selfe ; And it will draw neerer, to giue you satisfaction, to your principall Question.*

There raigned in this Island, about 1900. *yeares agoe, a* King, *whose memory of all others wee most adore ; Not Superstitiously, but as a Diuine Instrument, though a Mortall Man : His Name was* Solamona : *And wee esteeme him as the* Law-giuer *of our Nation. This* King *had* a large Heart, *inscrutable for good ; And was wholly bent to make his Kingdome and People Happy. Hee therefore taking into Consideration, how sufficient and substantiue this Land was, to maintaine it selfe without any aid (at all) of the Forrainer ; Being* 5600. *Miles in circuit, and of rare Fertility of Soyle, in the greatest Part thereof ; And finding also the Shipping of this Countrey mought bee plentifully set on worke, both by Fishing, and by Transportations from Port to Port, and likewise by Sayling*

vnto

vnto some small Islands that are not farre from vs, and are vnder the Crowne and Lawes of this State; And recalling into his Memory, the happy and flouriſhing Eſtate, wherein this Land then was; So as it mought bee a thouſand wayes altered to the worſe, but ſcarce any one way to the better; thought nothing wanted to his Noble and Heroicall Intentions, but onely (as farre as Humane fore-ſight mought reach) to giue perpetuity to that, which was in his time ſo happily eſtabliſhed. Therefore amongſt his other Fundamentall Lawes of this Kingdome, he dia ordaine the Interdicts and Prohibitions, which wee haue touching Entrance of Strangers; which at that time (though it was after the Calamity of America) was frequent; Doubting Nouelties, and Commixture of Manners. It is true, the like Law, againſt the Admiſſion of Strangers without Licenſe, is an Ancient Law, in the Kingdome of China, and yet continued in vſe. But there it is a poore Thing; And hath made them a curious, ignorant, fearefull, fooliſh Nation. But our Law-giuer made his Law of another temper. For firſt, hee hath preſerued all points of Humanity, in taking Order, and making Prouiſion for the Releefe of Strangers diſtreſſed; whereof you haue taſted. At which Speech (as reaſon was) wee all roſe vp, and bowed our ſelues. Hee went on. That King alſo ſtill deſiring to ioyne Humanity and Policy together; And thinking it againſt Humanity, to detaine Strangers here againſt their wills; And againſt Policy, that they ſhould returne, and diſcouer their Knowledge of this Eſtate, hee tooke this Courſe: He did ordaine, that of the Strangers that ſhould bee permitted to Land, as many (at all times) mought depart as would; But as many as would ſtay, ſhould haue very good Conditions, and Meanes to liue, from the State. Wherein hee ſaw ſo farre, that now in ſo many Ages ſince the Prohibition, we haue memory not of one Ship that euer returned, and but of thirteene Perſons onely, at ſeuerall times, that choſe to returne in our Bottomes. What thoſe few that returned may haue reported abroad I know not. But you muſt thinke, Whatſoeuer they haue ſaid, could bee taken where they came, but for a Dreame. Now for our Trauelling from hence into Parts abroad, our Law-Giuer thought fit altogether to reſtraine it. So is it not in China. For the Chineſes ſayle where they will, or can; which ſheweth, that their

their Law of keeping out Strangers, is a Law of Pusillanimity, and feare. But this restraint of ours, hath one onely Exception, which is admirable; Preseruing the good which commeth by communicating with Strangers, and auoyding the Hurt; And I will now open it to you. And here I shall seeme a little to digresse, but you will by and by finde it pertinent. Yee shall vnderstand, (my deare Friends,) that amongst the Excellent Acts of that King, *one aboue all hath the preheminence. It was the Erection, and Institution of an* Order, *or* Society, *which wee call* Salomons House; *The Noblest Foundation, (as we thinke,) that euer was vpon the Earth; And the Lanthorn of this Kingdome. It is dedicated to the Study of the* Workes, *and* Creatures *of* GOD. *Some thinke it beareth the Founders Name a little corrupted, as if it should bee* Solamona's House. *But the Records write it, as it is spoken. So as I take it to bee denominate of the* King *of the* Hebrewes, *which is famous with you, and no Stranger to vs. For wee haue some Parts of his Workes, which with you are lost; Namely that* Naturall History, *which he wrote of all* Plants, *from the* Cedar of Libanus, *to the* Mosse that groweth out of the Wall; *And of all* things that haue Life and Motion. *This maketh me thinke, that our* King *finding himselfe to Symbolize in many things, with that* King *of the* Hebrewes (*which liued many yeares before him*) *honoured him with the Title of this Foundation. And I am the rather induced to bee of this Opinion, for that I finde in Ancient Records, this* Order *or* Society *is sometimes called* Salomons House; *And sometimes the* College *of* the Six Dayes Workes: *Whereby I am satisfied, That our Excellent* King *had learned from the* Hebrewes; *That* GOD *had created the World, and all that therein is, within six Daies; And therefore hee instituting that* House, *for the finding out of the true Nature of all things, (whereby* GOD *mought haue the more Glorie in the Workemanship of them, and Men the more fruit in the vse of them,) did giue it also that second Name. But now to come to our present purpose. When the* King *had forbidden to all his People, Nauigation into any Part, that was not vnder his Crowne, hee made neuertheless this Ordinance; That euery twelue yeares there should bee set forth, out of this* Kingdome, *two Ships, appointed to seuerall Voyages; That in either of these Ships,*

Ships, there should be a Mission of three of the Fellowes, *or* Brethren *of* Salomons Houſe; *whoſe Errand was only to giue vs Knowledge of the Affaires and State of thoſe Countries, to which they were deſigned; And eſpecially of the Sciences, Arts, Manufactures, and Inuentions of all the World; And withall to bring vnto vs, Bookes, Inſtruments, and Patterns, in euery kinde: That the Ships, after they had landed the* Brethren, *ſhould returne; and that the* Brethren *ſhould ſtay abroad till the new Miſſion: Theſe Ships are not otherwiſe fraught, than with Store of Victualls, and good Quantity of Treaſure to remaine with the* Brethren, *for the buying of ſuch Things, and rewarding of ſuch Perſons, as they ſhould thinke fit. Now for me to tell you, how the Vulgar ſort of Mariners are contained from being diſcouered at Land; And how they that muſt be put on ſhore for any time, colour themſelues vnder the Names of other Nations, And to what places theſe Voyages haue beene deſigned; And what places of* Rendez-Vous *are appointed for the new Miſſions, And the like Circumſtances of the Practique, I may not doe it; Neither is it much to your deſire. But thus you ſee, wee maintaine a Trade, not for Gold, Siluer, or Iewels; Nor for Silkes; Nor for Spices; Nor any other Commodity of Matter; But onely for* Gods *firſt Creature, which was* Light: *To haue* Light (*I ſay*) *of the Growth of all Parts of the World.* And when hee had ſaid this, hee was ſilent; And ſo were wee all. For indeed wee were all aſtoniſhed, to heare ſo ſtrange things ſo probably told. And hee perceiuing, that wee were willing to ſay ſomewhat, but had it not ready, in great Courteſie tooke vs off, and deſcended to aske vs Queſtions of our Voyage and Fortunes, and in the end concluded, that wee mought doe well, to thinke with our ſelues, what time of ſtay wee would demand of the State; And bad vs not to ſcant our ſelues; For hee would procure ſuch time as wee deſired. Whereupon wee all roſe vp, and preſented our ſelues to kiſſe the skirt of his Tippet, But hee would not ſuffer vs; and ſo tooke his leaue. But when it came once amongſt our People, that the State vſed to offer Conditions to Strangers, that would ſtay, wee had Worke enough to get any of our Men to looke to our Ship; And

to

to keepe them from going presently to the Gouernour, to craue Conditions. But with much adoe wee refrained them, till wee mought agree what course to take.

We tooke our selues now for free men, seeing there was no danger of our vtter Perdition, And liued most ioyfully, going abroad, and seeing what was to bee seen, in the Citty and places adiacent, within our *Tedder*; And obtaining Acquaintance with many of the Citty, not of the meanest Quallity; At whose hands wee found such Humanity, and such a freedome and desire, to take Strangers, as it were, into their Bosome, as was enough to make vs forget all that was deare to vs, in our owne Countries: And continually wee met with many things, right worthy of Obseruation, and Relation: As indeed, if there bee a Mirrour in the World, worthy to hold Mens Eyes, it is that Country. One day there were two of our Company bidden to a *Feast* of the *Family*, as they call it. A most Naturall, Pious, and Reuerend Custome it is, shewing that Nation to bee compounded of all Goodnes. This is the manner of it. It is granted to any Man, that shall liue to see thirty Persons, descended of his Body, aliue together, and all aboue 3. yeares old, to make this *Feast*, which is done at the Cost of the State. The *Father* of the *Family*, whom they call the *Tirsan*, two days before the *Feast*, taketh to him three of such Friends as he liketh to chuse; And is assisted also by the Gouernour of the City, or Place, where the *Feast is* celebrated; And all the *Persons* of the *Family*, of both Sexes, are summoned to attend him. These two dayes the *Tirsan* sitteth in Consultation, concerning the good Estate of the *Family*. There, if there be any Discord or Sutes betweene any of the *Family*, they are compounded and appeased. There, if any of the Family bee Distressed or Decayed, order is taken for their Reliefe, and competent meanes to liue. There if any bee subiect to vice or take ill Courses, they are reproued and Censured. So likewise, Direction is giuen touching Marriages, and the courses of life, which any of them should take, with diuers other the like Orders and Aduises. The Gouernour assisteth, to the end, to put in Execution, by his Publike

Publike Authority, the Decrees and Orders of the *Tirſan*, if they ſhould bee diſobeyed; Though that ſeldome needeth; Such Reuerence and Obedience they giue, to the Order of Nature. The *Tirſan* doth alſo then, euer chuſe one Man from amongſt his Sonnes, to liue in Houſe with him: Who is called, euer after, the *Sonne of the Vine*. The Reaſon will hereafter appeare. On the *Feaſt* day, the *Father* or *Tirſan* commeth foorth after Diuine Seruice; into a large Roome, where the *Feaſt* is celebrated, Which Roome hath an Halfe-Pace at the vpper end. Againſt the wall, in the middle of the halfe-pace, is a Chaire placed for him, with a Table and Carpet before it. Ouer the Chaire is a State, made Round or Ouall, and It is of Iuy; An Iuy ſomewhat whiter than ours, like the Leafe of a Siluer Aſpe, but more ſhining; For it is greene all winter. And the State is curiouſly wrought with Siluer and Silke of diuers Colours, broyding or binding in the Iuy; And is euer of the worke, of ſome of the Daughters of the Family; And vailed ouer at the top, with a fine Net of Silke and Siluer. But the Subſtance of it is true Iuy; whereof, after it is taken downe, the Friends of the Family, are deſirous to haue ſome Leafe or Sprig to keepe. The *Tirſan* commeth forth with all his Generation or Linage, the Males before him, and the Females following him; And if there be a Mother, from whoſe Body the Whole Linage is deſcended, there is a Trauerſe placed in a Loft aboue on the right hand of the Chaire, with a priuy Dore, and a carued Window of Glaſſe, leaded with Gold and blew; Where ſhe ſitteth, but is not ſeene. When the *Tirſan* is come foorth, hee ſitteth downe in the Chaire; And all the Linage place themſelues againſt the wall, both at his backe, and vpon the Returne of the Halfe-pace, in Order of their yeares, without difference of Sex, and ſtanding vpon their Feet. When hee is ſet, the Roome being alwaies full of Company; but well kept and without Diſorder, after ſome pauſe, there commeth in from the lower end of the Roome, a *Taratan*, (which is as much as an *Herald*;)

And on either side of him two *yong Lads*; Whereof one carrieth a Scrowle of their shining yellow Parchment, And the other a cluster of Grapes of Gold, with a long Foot or Stalke. The *Herald*, and *Children*, are clothed with Mantles of Sea-water greene Sattin; But the *Heralds* Mantle is streamed with Gold, and hath a Traine. Then the *Herald* with three Curtesies, or rather Inclinations, commeth vp as farre as the Halfe-pace; And there first taketh into his Hand the Scrowle. This Scrowle is the *Kings Charter*, containing Gift of Reuenew, and many Priuileges, Exemptions, and Points of Honour, granted to the *Father* of the *Family*; And it is euer stiled and directed; *To such an one, Our welbeloued Friend and Creditour:* Which is a Title proper onely to this Case. For they say, the King is Debter to no Man, but for Propagation of his Subiects, The Seale set to the *Kings Charter*, is the Kings Image, Imbossed or moulded in Gold; And though such *Charters* bee expedited of Course, and as of Right, yet they are varied by discretion, according to the Number and Dignitie of the *Family*. This *Charter* the *Herald* readeth aloud; And while it is read, the *Father* or *Tirsan*, standeth vp, supported by two of his Sonnes, such as hee chooseth. Then the *Herald* mounteth the halfe-Pace, and deliuereth the *Charter* into his Hand: And with that there is an Acclamation, by all that are present, in their Language, which is thus much, *Happy are the Peole of Bensalem.* Then the *Herald* taketh into his Hand from the other Child, the Cluster of Grapes, which is of Gold; Both the Stalke, and the Grapes. But the Grapes are daintily enamelled; And if the Males of the *Family* bee the greater number, the Grapes are enamelled Purple, with a little Sunne set on the Top; If the Females, then they are enamelled into a greenish yellow, with a Cressant on the Top. The Grapes are in number as many as there are Descendants of the *Family*. This Golden Cluster, the *Herald* deliuereth also to the *Tirsan*; who presently deliuereth it ouer, to that Sonne, that hee had formerly

merly chosen, to bee in House with him: Who beareth it before his *Father*, as an Ensigne of Honour, when hee goeth in publike euer after; And is thereupon called *the Sonne of the Vine*. After this Ceremony ended, the *Father* or *Tirsan* retireth, And after some time commeth forth againe to Dinner, where hee sitteth alone vnder the State, as before; And none of his Descendants sit with him, of what Degree or Dignitie soeuer, except hee hap to bee of *Salomons House*. Hee is serued onely by his owne Children, such as are Male; who performe vnto him all seruice of the Table vpon the knee; And the Women onely stand about him, leaning against the wall. The Roome belowe the Halfe-pace, hath Tables on the sides for the Guests that are bidden; Who are serued with great and comely order; And towards the end of Dinner (which in the greatest Feasts with them, lasteth neuer aboue an Houre and a halfe) there is an *Hymne* sung, varied according to the Inuention of him that composeth it; (for they haue excellent Poesie,) But the Subiect of it is (alwayes) the prayses of *Adam*, and *Noah*, and *Abraham*; Whereof the former two Peopled the World, and the last was the *Father* of the *Faithfull*: Concluding euer with a Thanksgiuing for the *Natiuitie* of our *Sauiour*, in whose Birth, the Births of all are onely Blessed. Dinner being done, the *Tirsan* retireth againe; And hauing withdrawne himselfe alone into a place; where he maketh some priuate Prayers, hee commeth forth the third time, to giue the Blessing; with all his Descendants, who stand about him as at the first. Then hee calleth them forth by one and by one, by name, as hee pleaseth, though seldome the Order of Age bee inuerted. The person that is called, (the Table being before remoued), kneeleth downe before the Chaire, and the *Father* layeth his Hand, vpon his Head, or her Head, and giueth the Blessing in these words: *Sonne of Bensalem*, (*or Daughter of Bensalem*,) *thy Father saith it; The Man by whom thou hast Breath and Life speaketh the word; The Blessing of the Euerlasting Father,*

the Prince of Peace, and the Holy Doue bee vpon thee, and make the dayes of thy Pilgrimage good and many. This hee ſaith to euery of them; And that done, if there bee any of his Sonnes, of eminent Merrit and Vertue, (ſo they bee not aboue two,) hee calleth for them againe; And ſaith, laying his Arme ouer their ſhoulders, they ſtanding; *Sonnes, it is well you are borne, giue God the praiſe, and perſeuere to the end.* And withall deliuereth to either of them a Iewell, made in the Figure of an Eare of Wheat, which they euer after weare in the front of their Turban, or Hatt, This done, they fall to Muſicke and dances, And other Recreations, after their manner, for the reſt of the day. This is the full order of that *Feaſt.*

By that time, ſix or ſeuen Dayes were ſpent, I was fallen into ſtraight Acquaintance, with a *Merchant* of that *Citty*, whoſe Name was *Ioabin.* Hee was a *Iew* and *Circumciſed*: For they haue ſome few Stirps of *Iewes*, yet remaining among them, whom they leaue to their owne Religion. Which they may the better doe, becauſe they are of a farre differing Diſpoſition from the *Iewes* in other Parts. For whereas they hate the name of CHRIST; And haue a ſecret inbred Rancour againſt the People amongſt whom they liue; Theſe (contrariwiſe) giue vnto our SAVIOVR many high Attributes, and loue the *Nation* of *Benſalem*, extremely. Surely this Man, of whom I ſpeake, would euer acknowledge, that CHRIST was borne of a *Virgin*; And that hee was more than a Man; And he would tell how GOD made him Ruler of the *Seraphims*, which guard his Throane; And they call him alſo the *Milken Way*, and the *Eliah* of the *Meſſiah*; And many other High Names; which though they bee Inferiour to his Diuine Maieſty, Yet they are farre from the Language of other *Iewes.* And for the Countrey of *Benſalem*, this Man would make no end of commending it; Being deſirous by Tradition among the *Iewes* there, to haue it beleeued, that the People thereof were of the Generations of *Abraham*, by another Sonne, whom they call *Nachoran*, And that

that *Moſes* by a ſecret *Cabala* ordained the Lawes of *Benſalem* which they now vſe ; And that when the *Meſsiah* ſhould come, and ſit in his Throne at *Hieruſalem*, the King of *Benſalem*, ſhould ſit at his feet, whereas other Kings ſhould keepe a great diſtance. But yet ſetting aſide theſe *Iewiſh* Dreames, the Man was a wiſe Man, and learned, and of great Pollicy, and excellently ſeene in the Lawes and Cuſtomes of that Nation. Amongſt other Diſcourſes, one day, I told him, I was much affected with the Relation I had, from ſome of the Company, of their Cuſtome, in holding the *Feaſt* of the *Family* ; For that (me thought) I had neuer heard of a Solemnity, wherein Nature did ſo much preſide. And becauſe Propagation of Families, proceedeth from the Nuptiall Copulation, I deſired to know of him, what Lawes and Cuſtomes they had concerning Marriage ; And whether they kept Marriage well ; And whether they were tyed to one Wife ? For that where Population is ſo much affected, and ſuch as with them it ſeemed to bee, there is commonly Permiſſion of *Plurality* of *Wiues*. To this hee ſaid ; *You haue Reaſon for to commend that excellent Inſtitution of the* Feaſt *of the* Family, *And indeed wee haue Experience, that thoſe Families, that are partakers of the Bleſsing of that Feaſt, doe flouriſh and proſper euer after, in an extraordinary manner. But heare mee now and I will tell you what I know. You ſhall vnderſtand, that there is not vnder the Heauens, ſo chaſt a Nation, as this of Benſalem ; Nor ſo free from all Pollution or fouleneſſe. It is the Virgin of the World. I remember, I haue read in one of your* Europæan *Bookes, of an holy Hermit amongſt you, that deſired to ſee the* Spirit *of* Fornication, *and there appeared to him, a little foule vgly* Aethiope : *But if hee had deſired to ſee the* Spirit *of* Chaſtitie *of* Benſalem, *it would haue appeared to him, in the likeneſſe of a faire beautiful* Cherubine. *For there is nothing, amongſt Mortall Men, more faire and admirable, than the Chaſt Mindes of this People. Knowe therefore, that with them there are no Stewes, no diſſolute Houſes, no Curtiſans, nor any thing of that kinde. Nay they wonder (with deteſtation) at you in* Europe, *which permit*

permit such things. They say ye haue put Marriage out of office: For Mariage is ordained a Remedy for vnlawfull Concupiscence; And Naturall Concupiscence seemeth as a spurr to Marriage. But when Men haue at hand a Remedy, more agreeable to their corrupt will, Marriage is almost expulsed. And therefore there are with you seene infinit Men, that marry not, but chuse rather a libertine and impure single Life, than to bee yoaked in Marriage; And many that doe marry, marry late, when the Prime and Strength of their Yeares is past. And when they doe marry, what is Marriage to them, but a very Bargaine; Wherin is sought Aliance, or Portion, or Reputation, with some desire (almost indifferent) of Issue; And not the faithfull Nuptiall Vnion of Man and Wife, that was first instituted. Neither is it possible, that those that haue cast away so basely, so much of their Strength, should greatly esteeme Children, (being of the same Matter,) as Chaste Men doe. So likewise during Marriage is the Case much amended, as it ought to bee if those things were tolerated onely for necessitie; No, but they remaine still as a very Affront to Marriage. The Haunting of those dissolute places, or resort to Curtizans, are no more punished in Married Men, than in Batchellers. And the depraued Custome of change, and the Delight in Meretricious Embracements, (where sinne is turned into Art,) maketh Marriage a dull thing, and a kinde of Impostion, or Taxe. They heare you defend these things, as done to auoyd greater Euills; As Aduoutries, Deflouring of Virgins, Vnnaturall lust, and the like. But they say, this is a preposterous Wisdome; And they call it Lots offer, who to saue his Guests from abusing, Offered his Daughters: Nay they say further, That there is litle gained in this; For that the same Vices and Appetites, doe still remaine and abound; Vnlawfull Lust being like a Furnace, that if you stop the Flames altogether, it will quench; But if you giue it any vent, it will rage, As for Masculine Loue, they haue no touch of it; And yet there are not, so faithfull and inuiolate Friendships, in the world againe, as are there, And to speake generally, (as I sayd before,) I haue not read of any such Chastity, in any People, as theirs. And their vsuall saying is, That whosoeuer is vnchaste can not reuerence himselfe: And they say;

That

That the reuerence of a Mans selfe, is, next Religion, the chiefest Bridle of all Vices. And when hee had said this, the good *Iew* pawsed a little; Whereupon, I far more willing to heare him speake on, than to speake my selfe; yet thinking it decent, that vpon his pawse of Speech, I should not be altogether silent, said onely this; *That I would say to him, as the* Widow *of* Sarepta *said to* Elias; *that hee was come to bring to Memory our Sinnes; And that I confesse the* Righteousnesse *of* Bensalem, *was greater than the* Righteousnesse *of* Europe. At which speech hee bowed his Head, and went on this manner. *They haue also many wise and excellent Lawes touching* Marriage. *They allow no* Polygamy. *They haue ordained that none doe intermarry or contract, vntill a Moneth bee past from their first Inter-view.* Marriage *without consent of Parents they doe not make voyd, but they mulct it in the Inheritors: For the Children of such* Marriages, *are not admitted to inherit, aboue a third Part of their Parents Inheritance. I haue read in a* Booke *of one of your* Men, *of a* Feigned Common-wealth, *where the Married couple are permitted, before they Contract, to see one another Naked. This they dislike: For they thinke it a Scorne, to giue a Refusall after so Familiar Knowledge: But because of many hidden Defects in Men and Womens Bodies, they haue a more Ciuill Way: For they haue neare euery Towne, a Couple of* Pooles, (*which they call* Adam *and* Eues Pooles,) *where it is permitted to one of the friends of the Man, and another of the friends of the Woman, to see them seuerally bath Naked.*

And as wee were thus in Conference, there came one that seemed to bee a Messenger, in a rich Huke, that spake with the *Iew*: whereupon hee turned to mee, and said; *You will pardon mee, for I am commanded away in haste.* The next Morning hee came to mee againe, ioyfull as it seemed, and said; *There is word come to the Gouernour of the City, that one of the* Fathers *of* Salomons House, *will bee here this day Seuen-night: Wee haue seene none of them this Dozen Yeares. His Comming is in State; But the cause of his comming is secret. I will prouide you, and your Fellowes, of a good Standing*

Standing to see his Entry. I thanked him, and told him; I *was most glad of the Newes* The day being come hee made his Entry. Hee was a *Man* of middle Stature, and Age, comely of Person, and had an Aspect as if hee pitied Men. Hee was cloathed in a Roabe of fine blacke Cloth, with wide Sleeues, and a Cape. His vnder Garment was of excellent white Linnen, downe to the Foot, girt with a Girdle of the same; And a Sindon or Tippet of the same about his Necke. Hee had Gloues, that were curious, and set with Stone; And Shoes of Peach-coloured Veluet. His Necke was bare to the Shoulders. His Hat was like a Helmet, or *Spanish Montera*; And his Locks curled below it decently: They were of Colour browne. His Beard was cut round, and of the same colour with his Haire, somewhat lighter. Hee was carried in a rich Chariot, without wheeles, Litter-wise, With two Horses at either end, richly trapped in blew Vellet Embroydered; and two Footemen on each side in the like Attire. The Chariot was all of Cedar, gilt, and adorned with Chrystall; Saue that the For-end had Pannells of Sapphires, set in Borders of Gold; And the Hinder-end the like of Emerauds of the *Peru* Colour. There was also a Sunne of Gold, Radiant vpon the Top, in the Midst; And on the Top before, a small *Cherub* of Gold, with Wings displayed. The Chariot was couered with Cloth of Gold tissued vpon blew. Hee had before him fifty Attendants, yong Men all, in white *Satten* loose Coats to the Mid Legg, and Stockins of white Silk; And Shoes of blew Veluet; And Hats of blew Veluet; with fine Plumes of diuerse Colours, set round like Hat-bands. Next before the Chariot, went two Men, bare headed, in Linnen Garments downe to the Foot, girt, and Shoes of blew Veluet, Who carried the one a Crosier, the other a Pastorall Staffe like a Sheepe-hooke: Neither of them of Mettall, but the Crosier of Balme-wood, the Pastorall Staffe of Cedar. Horse-Men hee had none, neither before, nor behind his Chariot: As it seemeth to auoyd all Tumult and Trouble. Behinde his

his Chariot, went all the Officers and Principals of the Companies of the City. Hee ſate alone, vpon Cuſhions, of a kinde of excellent Pluſh, blew; And vnder his Foot curious Carpets of Silke of diuers Colours, like the Perſian, but farre finer. Hee held vp his Bare Hand, as hee went, as bleſſing the People, but in Silence. The Street was wonderfully well kept; So that there was neuer any Army had their Men ſtand in better Battell-Array, than the People ſtood. The Windowes likewiſe were not crouded, but euery one ſtood in them, as if they had beene placed. When the ſhew was paſt, the *Iew* ſaid to mee; *I ſhall not bee able to attend you as I would, in regard of ſome charge the City hath lay'd vpon mee, for the Entertaining of this Great Perſon.* Three dayes after the *Iew* came to mee againe, and ſaid; *Yee are happy Men; For the* Father *of* Salomons Houſe *taketh knowledge of your Being here, and commanded mee to tell you, that hee will admit all your Company to his preſence, and haue priuate Conference with one of you, that yee ſhall chooſe: And for this hath appointed the next day after to Morrow. And becauſe hee meaneth to giue you his Bleſſing, hee hath appointed it in the Fore-Noone.* Wee came at our Day, and Houre, and I was choſen by my Fellowes for the priuate Acceſſe. Wee found him in a faire Chamber, richly hanged, and carpetted vnder Foote, without any Degrees to the State. Hee was ſet vpon a Low Throne richly adorned, and a rich Cloth of State ouer his Head, of Blew Sattin Embroidered. Hee was alone, ſaue that hee had two Pages of Honour, on either Hand one, finely attired in White. His Vnder Garments were the like that wee ſaw him weare in the Chariot; But in ſtead of his Gowne, hee had on him a Mantle with a Cape, of the ſame fine Blacke, faſtned about him. When wee came in, as we were taught, we bowed Low at our firſt Entrance; And when wee were come neere his Chaire, hee ſtood vp, holding forth his Hand vngloued, and in Poſture of Bleſſing; And wee euery one of vs ſtooped downe, and kiſſed the Hemme of his Tippet. That done, the reſt departed, and I remained.

Then he Warned the Pages forth of the Roome, and caused mee to sit downe beside him, and spake to mee thus in the *Spanish Tongue.*

GOD *blesse thee, my Sonne; I will giue thee the greatest Iewell I haue. For I will impart vnto thee, for the Loue of* GOD *and Men, a Relation of the true State of* Salomons House. *Sonne, to make you know the true state of* Salomons House, *I will keepe this order. First I will set forth vnto you the* End *of our* Foundation. *Secondly, the* Preparations *and* Instruments *wee haue for our* Workes. *Thirdly, the seuerall* Employments *and* Functions *wherto our* Fellowes *are assigned. And fourthly the* Ordinances *and* Rites *which wee obserue.*

The End *of our* Foundation *is the Knowledge of* Causes, *and Secret Motions of Things; and the Enlarging of the bounds of* Humane Empire, *to the Effecting of all Things possible.*

The Preparations *and* Instruments *are these. We haue large and deepe* Caues *of seuerall Depths: The deepest are sunke* 600. *Fathome: And some of them are digged and made vnder great Hills and Mountaines: So that if you reckon together the Depth of the Hill, and the Depth of the* Caue, *they are (some of them) aboue three Miles*

Miles deepe. For wee finde, that the Depth of a Hill, and the Depth of a Caue from the Flat, is the same Thing; Both remote alike, from the Sunn and Heauens Beames, and from the open Ayre. These Caues wee call the Lower Region. And wee vse them for all Coagulations, Indurations, Refrigerations, and Conseruations, of Bodies. Wee vse them likewise for the Imitation of Naturall Mines; And the Producing also of New Artificiall Mettalls, by Compositions and Materialls which wee vse and lay there for many yeares. Wee vse them also sometimes, (which may seeme strange) for Curing of some Diseases, and for Prolongation of Life, in some Hermits that choose to liue there, well accommodated of all things necessarie, and indeed liue very long; By whom also wee learne many things.

Wee haue Burialls in seuerall Earths, where wee put diuers Cements, as the Chineses, doe their Porcellane. But wee haue them in greater Varietie, and some of them more fine. We also haue greate variety of Composts, and Soiles, for the Making of the Earth Fruitfull.

Wee haue High Towers; The Highest about halfe a Mile in Height; And some of them likewise set vpon High Mountaines: So that the Vantage of the Hill with the Tower, is in the highest of them three Miles at least. And these Places wee call the Vpper Region; Accounting the Aire betweene the High Places, and the

Lowe, *as a* Middle Region. *Wee vse these* Towers, *according to their seuerall Heights, and Situations, for* Insolation, Refrigeration, Conseruation. *And for the* View *of diuers* Meteors; *As* VVindes, Raine, Snow, Haile; *And some of the* Fiery Meteors *also. And vpon them, in some Places, are Dwellings of* Hermits, *whom we visit sometimes, and instruct what to obserue.*

Wee haue great Lakes *both* Salt, *and* Fresh, *whereof wee haue vse for the* Fish, *and* Fowle. *We vse them also for* Burialls *of some* Naturall Bodies: *For wee finde a difference in Things buried in* Earth, *or in* Aire *below the* Earth; *and things buried in* VVater. *Wee haue also* Pooles, *of which some doe straine* Fresh Water *out of* Salt; *And others by Art doe turne* Fresh Warter *into* Salt. *Wee haue also some* Rocks *in the Midst of the* Sea; *And some* Bayes *vpon the* Shore *for some* VVorks, *wherin is required the* Aire *and* Vapour *of the* Sea. *Wee haue likewise* Violent Streames *and* Cataracts, *which serue vs for many* Motions: *And likewise* Engines *for* Multiplying *and* Enforcing *of* Windes, *to set also on going diuerse* Motions.

Wee haue also a Number of Artificiall VVells, *and* Fountaines, *made in Imitation of the* Naturall Sources *and* Bathes; *As tincted vpon* Vitrioll, Sulphur, Steele, Brasse, Lead, Nitre, *and other* Mineralls: *And againe wee haue little* Well-

VVells *for* Infusions *of many* Things, *where the* VVaters *take the Vertue quicker and better, than in* Vessells, *or* Basins. *And amongst them wee haue a* Water, *which wee call* Water *of* Paradise, *being, by that wee doe to it, made very Soueraigne for* Health, *and* Prolongation *of* Life.

Wee haue also Great *and spacious* Houses, *where wee imitate and demonstrate* Meteors; *As* Snow, Haile, Raine, *some* Artificiall Raines *of* Bodies, *and not of* VVater, Thunders, Lightnings; *Also* Generations *of* Bodies *in* Aire; *As* Frogs, Flies, *and diuerse Others.*

We haue also certaine Chambers, *which we call* Chambers *of* Health, *where wee qualifie the* Aire *as wee thinke good and proper for the* Cure *of diuerse* Diseases, *and* Preseruation *of* Health.

Wee haue also faire and large Baths, *of seuerall* Mixtures, *for the* Cure *of* Diseases, *and the* Restoring *of* Mans Body *from* Arefaction: *And Others for the* Confirming *of it in* Strength *of* Sinnewes, Vitall Parts, *and the very* Iuyce *and* Substance *of the* Body.

Wee haue also large and various Orchards, *and* Gardens; *Wherin we doe not so much respect Beauty, as Variety of Ground and Soile, proper for diuerse* Trees, *and* Herbs: *And some very spacious, where* Trees, *and* Berries *are set, whereof wee make diuerse Kindes of* Drinkes, *besides the* Vine-yards. *In these wee practise likewise all Conclusions of* Grafting, *and* Inoculating, *as well of* VVilde-Trees,

as Fruit-Trees, *which produceth many Effects. And wee make (by Art) in the same* Orchards, *and* Gardens, Trees *and* Flowers, *to come earlier, or later than their* Seasons; *And to come vp and beare more speedily than by their* Naturall Course *they doe. Wee make them also by* Art *greater much than their* Nature; *And their* Fruit *greater, and sweeter, and of differing* Taste, Smell, Colour, *and* Figure, *from their* Nature. *And many of them wee so Order as they become of* Medicinall Vse.

Wee haue also Meanes to make diuerse Plants *rise by* Mixtures *of* Earthes *without* Seeds; *And likewise to make diuerse New* Plants, *differing from the Vulgar; and to make one* Tree *or* Plant *turne into another.*

Wee haue also Parkes, *and* Enclosures *of all Sorts of* Beasts, *and* Birds; *which wee vse not onely for View or Rareness, but likewise for* Dissections, *and* Triall; *That therby wee may take light, what may bee wrought vpon the* Body *of* Man. *Wherin wee finde many strange Effects; As* Continuing Life *in them, though diuers* Parts, *which you account* Vitall, *bee perished, and taken forth;* Resuscitating *of some that seeme* Dead *in* Appearance; *And the like. Wee try also all* Poysons, *and other* Medicines *vpon them, as well of* Chyrurgery, *as* Phisicke. *By* Art *likewise, wee make them* Greater, *or* Taller, *than their* Kinde *is; And contrary-wise* Dwarfe *them and stay their* Growth:

Wee

Wee make them more Fruitfull, *and* Bearing *than their* Kinde *is*; *And contrary-wise* Baren *and not* Generatiue. *Also wee make them differ in* Colour, Shape, Actiuity, *many wayes. Wee finde Meanes to make* Commixtures *and* Copulations *of diuerse* Kindes; *which haue produced many* New Kindes, *and them not* Barren, *as the generall Opinion is. Wee make a Number of* Kindes, *of* Serpents, Wormes, Flies, Fishes, *of* Putrefaction; *whereof some are aduanced (in effect) to be* Perfect Creatures, *like* Beasts, *or* Birds; *And haue* Sexes, *and doe* Propagate. *Neither doe wee this by* Chance, *but wee know before hand, of what* Matter *and* Commixture, *what* Kinde *of those* Creatures, *will arise.*

Wee haue also Particular Pooles, *where wee make* Trialls *vpon* Fishes, *as wee haue said before of* Beasts, *and* Birds.

Wee haue also Places *for* Breed *and* Generation *of those* Kindes *of* Wormes, *and* Flies, *which are of* Speciall Vse; *Such as are with you your* Silkwormes, *and* Bees.

I will not hold you long with recounting of our Brew-howses, Bake-houses, *and* Kitchins, *where are made diuerse* Drinks, Breads, *and* Meates, *Rare and of speciall Effects.* Wines *wee haue of* Grapes; *And* Drinkes *of other* Iuyce, *of* Fruits, *of* Graines, *and of* Rootes; *And of* Mixtures *with* Honey, Sugar, Manna, *and* Fruits dryed, *and* decocted: *Also of the* Teares *or* Woundings

dings of Trees ; And of the Pulp of Canes. And these Drinkes are of Seuerall Ages, some to the Age or Last of forty yeares. Wee haue Drinkes also brewed with Seuerall Herbs, and Roots, and Spices; Yea, with seuerall Fleshes, and VVhite-Meats ; Whereof some of the Drinkes are such as they are in effect Meat and Drinke both : So that Diuers, especially in Age, doe desire to liue with them, with little or no Meat, or Bread. And aboue all wee striue to haue Drinkes of Extreame Thin Parts; To insinuate into the Body, and yet without all Biting, Sharpnesse, or Fretting ; Insomuch as some of them, put vpon the Backe of your Hand, will, with a little stay, passe thorow to the Palme, and yet taste Milde to the Mouth. Wee haue also VVaters, which wee ripen in that fashion, as they become Nourishing ; So that they are indeed excellent Drinke ; And many will vse no other. Breads wee haue of Seuerall Graines, Roots, and Kernels ; Yea and some of Flesh , and Fish, Dried ; With diuers kindes of Leauenings, And Seasonings : So that some doe extreamely moue Appetittes ; Some doe Nourish so, as Diuers doe liue of them, without any other Meat ; Who liue very long. So for Meats, wee haue some of them so beaten , and made tender, and mortified, yet without all Corrupting, as a VVeake Heat of the Stomacke will turne them into good Chylus ; As well as a Strong Heat would Meat otherwise prepared. Wee haue some

some Meats *also, and* Breads, *and* Drinks, *which taken by Men, enable them to* Fast *long after; And some other, that vsed make the very* Flesh *of* Mens Bodies, *sensibly, more* Hard *and* Tough; *And their* Strength *farre greater, than otherwise it would be.*

Wee haue Dispensatories, *or* Shops *of* Medicines. *Wherein you may easily thinke, if wee haue such* Variety *of* Plants, *and* Liuing Creatures, *more than you haue in* Europe, (*for wee know what you haue,*) *the* Simples, Drugges, *and* Ingredients *of* Medicines, *must likewise be in so much the greater* Varietie. *Wee haue them likewise of diuers* Ages, *and long* Fermentations. *And for their* Preparations, *wee haue not onely all Manner of Exquisite* Distillations, *and* Separations, *and especially by* Gentle Heats, *and* Percolations *through diuerse* Strainers, *yea and* Substances; *But also exact* Formes *of* Composition, *wherby they incorporate almost as they were* Naturall Simples.

Wee haue also diuers Mechanicall Arts, *which you haue not; And* Stuffes *made by them; As* Papers, Linnen, Silkes, Tissues; *dainty* Workes *of* Feathers *of wonderfull Lustre; excellent* Dies, *and many others: And* Shops *likewise as well for such as are not brought into Vulgar vse amongst vs, as for those that are. For you must know, that of the Things before recited, many of them are growne into vse throughout the Kingdome; But*

yet, if they did flow from our Inuention, *wee haue of them also for* Patternes, *and* Principalls.

Wee haue also Fournaces *of great* Diuersities, *and that keepe great* Diuersitie *of* Heats: Fierce *and* Quicke; Strong *and* Constant; Soft *and* Milde; Blowne, Quiet, Drie, Moist; *And the like. But aboue all wee haue* Heats, *in Imitation of the* Sunnes *and* Heauenly Bodies Heats, *that passe diuerse* Inequalities, *and* (*as it were*) Orbs, Progresses, *and* Returnes, *wherby wee produce admirable effects. Besides wee haue* Heates *of* Dungs; *and of* Bellies *and* Mawes *of* Liuing Creatures *and of their* Bloods, *and* Bodies; *and of* Hayes *and* Herbs *layd vp moyst*; *of* Lime *vnquenched*; *and such like*. Instruments *also which generate* Heate *onely by* Motion. *And further*, Places *for Strong* Insolations; *And againe*, Places *vnder the* Earth, *which by* Nature, *or* Art, *yeeld* Heate. *These diuers* Heats *wee vse, As the* Nature *of the* Operation, *which wee intend, requireth.*

Wee haue also Perspectiue-houses, *where wee make* Demonstrations *of all* Lights, *and* Radiations: *And of all* Colours: *And out of* Things vncoloured *and* Transparent, *wee can represent vnto you all seuerall* Colours; *Not in* Rainebowes, (*as it is in* Gemmes, *and* Prismes,) *but of themselues Single. Wee represent also all* Multiplications *of* Light, *which wee carry to great* Distance: *and make so* Sharpe, *as to discerne small* Points

Points *and* Lines. *Also all* Colourations *of* Light. *All* Deluſions *and* Deceits *of the* Sight, *in* Figures, Magnitudes, Motions, Colours: *All* Demonſtrations *of* Shadowes. *Wee finde alſo diuerſe Meanes yet vnknowne to you, of* Producing *of* Light, *originally, from diuerſe* Bodies. *Wee procure meanes of Seing* Obiects a-farr off; *As in the* Heauen, *and* Remote Places: *And repreſent* Things Neare *as* A-farr off; *And* Things A-farr off *as* Neare; *Making* Fagined Diſtances. *Wee haue alſo* Helps *for the* Sight, *farr aboue* Spectacles *and* Glaſſes *in vſe. Wee haue alſo* Glaſſes *and* Meanes, *to ſee* Small *and* Minute Bodies, *perfectly and diſtinctly; As the* Shapes *and* Colours *of* Small Flies *and* Wormes, Graines *and* Flawes, *in* Gemmes *which cannot otherwiſe be ſeene,* Obſeruations *in* Vrine *and* Bloud *not otherwiſe to be ſeen. Wee make* Artificiall Raine-Bowes, Halo's, *and* Circles *about* Light. *Wee repreſent alſo all manner of* Reflexions, Refractions, *and* Multiplications *of* Viſuall Beames *of* Obiects.

Wee haue alſo Pretious Stones *of all kindes, many of them of great Beauty and to you vnknowne:* Chyſtalls *likewiſe; And* Glaſſes *of diuerſe kindes; And amongſt them ſome of* Mettals Vitrificated, *and other* Materialls, *beſides thoſe of which you make* Glaſſe. *Alſo a Number of* Foſſiles, *and* Imperfect Mineralls, *which you haue not. Likewiſe* Loadſtones *of Prodigious Vertue: And other rare* Stones, *both* Naturall *and* Artificiall.

Wee haue alſo Sound-houſes, *wher wee practiſe and demonſtrate all* Sounds, *and their* Generation. *Wee haue* Harmonies *which you haue not, of* Quarter-Sounds, *and leſſer* Slides *of* Sounds. *Diuerſe* Inſtruments *of* Muſicke *likewiſe to you vnknowne, ſome* ſweeter *than any you haue; Together with* Bells *and* Rings *that are dainty and ſweet. Wee repreſent* Small Sounds *as* Great *and* Deepe; *Likewiſe* Great Sounds, Extenuate *and* Sharpe; *Wee make diuerſe* Tremblings *and* Warblings *of* Sounds, *which in their* Originall *are* Entire. *Wee repreſent and imitate all* Articulate Sounds *and* Letters, *and the* Voices *a nd* Notes *of* Beaſts *and* Birds. *Wee haue certaine* Helps, *which ſet to the* Eare *doe further the* Hearing *greatly. Wee haue alſo diuerſe* Strange *and* Artificiall Echo's, Reflecting *the* Voice *many times, and as it were* Toſſing *it: And ſome that giue back the* Voice Lowder *than it came, ſome* Shriller, *and ſome* Deeper; *Yea ſome rendering the* Voice, Differing *in the* Letters *or* Articulate Sound, *from that they receiue. Wee haue alſo meanes to conuey* Sounds *in* Trunkes *and* Pipes, *in ſtrange* Lines *and* Diſtances.

Wee haue alſo Perfume-Houſes; *wherewith wee ioyne alſo* Practiſes *of* Taſte. *Wee* Multiply Smells, *which may ſeeme ſtrange. Wee* Imitate Smells, *making all* Smells *to breath out of other* Mixtures *than thoſe that giue them. Wee make diuerſe* Imitations *of* Taſte *likewiſe, ſo that they will*

will deceyue any Mans Taſte. *And in this* Houſe *wee containe alſo a* Confiture-Houſe; *where wee make all* Sweet Meates, Dry *and* Moiſt; *And diuerſe pleaſant* Wines, Milks, Broaths, *and* Sallets, *farr in greater variety, than you haue.*

Wee haue alſo Engine-Houſes, *where are prepared* Engines *and* Inſtruments *for all Sorts of* Motions. *There wee imitate and practiſe to make* Swifter Motions, *than any you haue, either out of your* Musketts, *or any* Engine *that you haue : And to* Make *them*, *and* Multiply *them more* Eaſily, *and with* Small Force, *by* Wheeles, *and other* Meanes : *And to make them* Stronger, *and more* Violent, *than yours are*; *Exceeding your greateſt* Cannons *and* Baſilisks. *Wee repreſent alſo* Ordnance *and* Inſtruments *of* Warr, *and* Engines *of all Kindes : And likewiſe New* Mixtures *and* Compoſitions *of* Gun-Powder, Wilde-Fires *burning in* Water, *and* Vnquenchable. *Alſo* Fire-workes *of all* Variety *both for* Pleaſure, *and* Vſe. *Wee imitate alſo* Flights *of* Birds; *Wee haue ſome* Degrees *of* Flying *in the* Ayre. *Wee haue* Shipps *and* Boates *for* Going *vnder* Water, *and* Brooking *of* Seas; *Alſo* Swimming-Girdles *and* Supporters. *Wee haue diuers curious* Clocks; *And other like* Motions *of* Returne: *And ſome* Perpetuall Motions. *Wee imitate alſo* Motions *of* Liuing Creatures, *by* Images *of* Men, Beaſts, Birds, Fiſhes, *and* Serpents, *Wee haue alſo a*

great Number of other Various Motions, *ſtrange for* Equality, Fineneſſe, *and* Subtilty.

We haue alſo a Mathematicall-Houſe *where are repreſented all* Inſtrumets, *as well of* Geometry, *as* Aſtronomy, *exquiſitely made.*

Wee haue alſo Houſes *of* Deceits *of the* Senſes; *where wee repreſent all manner of* Feats *of* Iugling, Falſe Apparitions, Impoſtures, *and* Illuſions; *And their* Fallaces. *And ſurely you will eaſily beleeue, that wee, that haue ſo many* Things *truly* Naturall, *which induce* Admiration, *could in a* VVorld *of* Particulars *deceiue the* Senſes, *if wee would diſguiſe thoſe* Things, *and labour to make them ſeeme more* Miraculous. *But wee doe hate all* Impoſtures, *and* Lies: *Inſomuch as we haue ſeuerely forbidden it to all our* Fellowes, *vnder paine of Ignominy and Fines, that they doe not ſhew any* Naturall worke *or Thing,* Adorned *or* Swelling; *but onely* Pure *as it is, and without all* Affectation *of* Strangeneſſe.

Theſe are (my Sonne) the Riches of Salomons Houſe.

For the ſeuerall Employments *and* Offices *of our* Fellowes; *Wee haue Twelue that Sayle into* Forraine Countreys *vnder the* Names *of other* Nations, (*for our owne wee conceale*;) *Who bring vs the* Bookes, *and* Abſtracts, *and* Patternes *of* Experiments *of all other* Parts.

Theſe

These wee call Merchants *of* Light.

Wee haue Three that Collect *the* Experiments *which are in all* Bookes. *These wee call* Depredators.

Wee haue Three that Collect *the* Experiments *of all* Mechanicall Arts; *And also of* Liberall Sciences; *And also of* Practises *which are not* Brought *into* Arts. *These wee call* Mystery-men.

Wee haue Three that try New Experiments *such as themselues thinke good. These wee call* Pioners *or* Miners.

Wee haue Three that Draw *the* Experiments *of the* Former Foure *into* Titles, *and* Tables, *to giue the better light for the drawing of* Obseruations *and* Axiomes *out of them. These wee call* Compilers.

Wee haue Three that bend themselues, Looking *into the* Experiments *of their* Fellowes, *and cast about how to draw out of them* Things *of* Vse, *and* Practise *for* Mans life, *and* Knowledge, *as well for* VVorkes *as for* Plaine Demonstration *of* Causes, Meanes *of* Naturall Diuinations, *and the easie and cleare* Discouery *of the* Vertues *and* Parts *of* Bodies. *These wee call* Dowry-men *or* Benefactors.

Then after diverse Meetings *and* Consults *of our whole* Number, *to consider of the former* Labours *and* Collections, *wee haue Three that take care, out of them, to* Direct New Experiments, *of a Higher*

Higher Light, *more* Penetrating *into* Nature *than the* Former. *These wee call* Lamps.

Wee haue Three others that doe Execute *the* Experiments *so* Directed, *and* Report *them. These wee call* Inoculators.

Lastly, wee haue Three that raise the former Discoueries *by* Experiments, *into* Gerater Obseruations, Axiomes, *and* Aphorismes. *These wee call* Interpreters *of* Nature.

Wee haue a so, as you must thinke, Nouices *and* Apprentices, *that the Succession of the former Employed Men doe not faile; Besides a great Number of* Seruants *and* Attendants, Men and Women. *And this wee doe also: Wee haue* Consultations, *which of the* Inuentions *and* Experiences, *which wee haue discouered, shall bee Published, and which not: And take all an* Oath *of* Secrecie, *for the Concealing of those which wee thinke fit to keepe Secret: Though some of those wee doe reueale sometimes to the* State, *and some not.*

For our Ordinances *and* Rites: *Wee haue two very* Long, *and* Faire Galleries: *In one of these wee place* Patterns *and* Samples *of all manner of the more* Rare *and* Excellent Inuentions: *In the other wee place the* Statua's *of all* Principall Inuentours. *There wee haue the* Statua *of your* Columbus, *that discouered the* VVest

VVest-Indies: *Also the* Inuentour *of* Shipps: *Your* Monke *that was the* Inuentour *of* Ordnance, *and of* Gunpowder: *The* Inuentour *of* Musicke: *The* Inuentour *of* Letters: *The* Inuentour *of* Printing: *The* Inuentour *of* Obseruations *of* Astronomy: *The* Inuentour *of* VVorks *in* Mettall: *The* Inuentour *of* Glasse: *The* Inuentour *of* Silke *of the* VVorme: *The* Inuentour *of* VVine: *The* Inuentour *of* Corne *and* Bread: *The* Inuentour *of* Sugars: *And all these, by more certaine Tradition, than you haue. Then haue wee diuerse* Inuentours *of our* Owne, *of* Excellent VVorks; *Which since you haue not seene, it were too long to make* Descriptions *of them; And besides, in the right Vnderstanding of those* Descriptions *you might easily erre. For vpon euery* Inuention *of Valew, wee erect a* Statua *to the* Inuentour, *and giue him a Liberall and Honourable* Reward. *These* Statua's *are, some of* Brasse; *some of* Marble *and* Touchstone; *some of* Cedar *and other speciall* VVoods *gilt and adorned; some of* Iron; *some of* Siluer; *some of* Gold.

VVe haue certaine Hymnes *and* Seruices, *which wee say dayly, of* Laud *and* Thankes *to* God *for his Marueilous* VVorks: *And* Formes *of* Prayers, *imploring his* Aide *and* Blessing, *for the* Illumination *of our* Labours; *and the turning of them into* Good *and* Holy Vses.

Lastly, wee haue Circuits *or* Visits, *of diuerse* Principall

Principall Cities *of the* Kingdome; *where as it commeth to passe, wee doe publish such New* Profitable Inuentions, *as wee thinke good. And wee doe also declare* Naturall Diuinations *of* Diseases, Plagues, Swarmes *of* Hurtfull Creatures, Scarcety, Tempests, Earthquakes, Great Inundations, Cometts, Temperature *of the* Yeare, *and diuerse other Things; And wee giue* Counsell *thereupon, what the* People *shall doe, for the* Preuention *and* Remedy *of them.*

And when Hee had sayd this, Hee stood vp: And I, as I had beene taught, kneeled downe; and Hee layd his Right Hand vpon my Head, and sayd; GOD *blesse thee, my Sonne; And* GOD *blesse this Relation, which I haue made. I giue thee leaue to Publish it, for the Good of other Nations; For wee here are in GODS Bosome, a Land vnknowne.* And so hee left mee; Hauing assigned a valew of about two Thousand Duckets, for a Bounty to mee and my Fellowes. For they giue great Largesses, where they come, vpon all occasions.

The rest was not Perfected.

MAGNALIA NATVRAE
PRÆCIPVE QVOAD
VSVS HVMANOS.

The Prolongation *of* Life.
The Restitution *of* Youth *in some* Degree.
The Retardation *of* Age.
The Curing *of* Diseases *counted* Incurable.
The Mitigation *of* Paine.
More Easie *and lesse* Loathsome Purgings.
The Encreasing *of* Strength *and* Actiuity.
The Encreasing *of* Ability *to suffer* Torture *or* Paine.
The Altering of Complexions : *and* Fatnesse, *and* Leanesse.
The Altering *of* Statures.
The Altering *of* Fetatures.
The Encreasing *and* Exalting *of the* Intellectuall Parts.
Versions *of* Bodies *into other* Bodies.
Making *of* New Species.
Transplanting *of one* Species *into another*.
Instruments *of* Destruction, *as of* VVarre *and* Poyson. Ex-

Exhilaration *of the* Spirits, *and* Putting *them in good* Disposition.

Force *of the* Imagination, *either vpon another* Body, *or vpon the* Body *it selfe.*

Acceleration *of* Time *in* Maturations.

Acceleration *of* Time *in* Clarifications.

Acceleration *of* Putrefaction.

Acceleration *of* Decoction.

Acceleration *of* Germination.

Making Rich Composts *for the* Earth.

Impressions *of the* Aire, *and* Raising *of* Tempests.

Great Alteration; *As in* Induration, Emollition, &c.

Turning Crude *and* Watry Substances, *into* Oyly *and* Vnctious Substances.

Drawing of New Foods *out of* Substances *not now in* Vse.

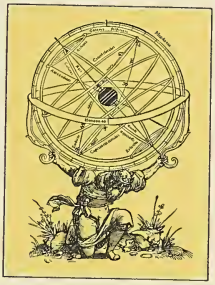
Making New Threds *for* Apparell; *And* New Stuffes, *Such as are* Paper, Glasse, &c.

Naturall Diuinations.

Deceptions *of the* Senses.

Greater Pleasures *of* the Senses.

Artificiall Minerals *and* Cements.

FINIS.

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